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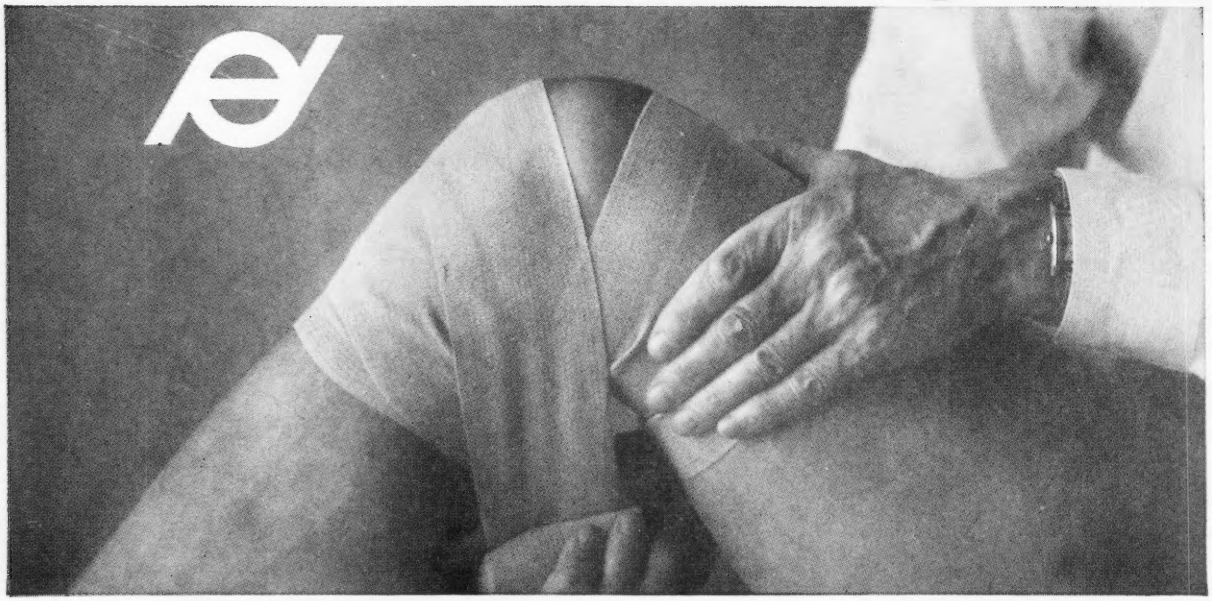

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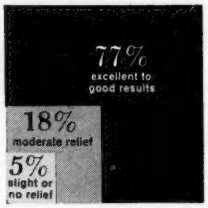
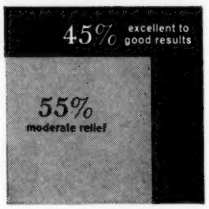
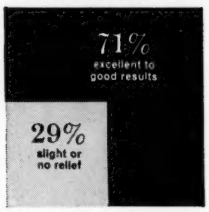


fractures, contusions, etc.



miscellaneous*



*Including traumatic synovitis, fibrositis, muscle injury and spasm

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Journal of Occupational Medicine

Health Hazards in the Construction Industry

Harold J. Magnuson, M.D., Washington, D.C.

APPROXIMATELY three million workers, nearly 4% of the total labor force in the United States, are employed in construction industry. In 1958, a total of 195,000 disabling injuries or cases of occupational diseases occurred among these workers. Preliminary estimates of the Labor Department indicated an even greater number of injuries in 1959. Although the accident rate for the contract construction industry has dropped 23% since 1946, the 1958 rate was still 30.9 disabling injuries per million man-hours worked. Compare this with the rate of 10.9 for all types of manufacturing, and the rate of 6.17 for all industry. These figures primarily reflect accident rather than occupational disease hazards, but the two areas are intimately related in the safeguarding of the worker's well-being.

Occupational diseases represent illnesses, other than traumatic injury, which result from exposures or conditions on the job. Since it would not be feasible to cover the huge number of occupations in the construction industry and their related health hazards, examples will be drawn from the three major areas of tunneling; highway, street, and bridge construction; and building construction.

Tunneling

With the growth of our metropolitan areas, tunnel construction has been on the increase. While there are still some inadequately solved health problems associated with tunnel construction, we no longer have Gauley Bridge disasters. This disaster represents one of the earliest recorded outbreaks of occupational disease involving large numbers of construction workers in this country. It occurred in 1930 during the construction of a tunnel at Gauley Bridge, W. Va. The tunnel, which was approximately 4 miles long and 32 feet in diameter, was designed to divert water for a hydroelectric power plant. According to testimony presented at a Congressional hearing in 1936, of the more than 2,000 persons employed during the two-year project, 476 tunnel workers had died from silicosis contracted during their employment and 1,500 additional workers were then suffering from silicosis.

Much of the testimony pointed out that, while the cause of silicosis was known and respirators and wet drilling could have been used to control the hazard, this particular company did nothing to protect the health of its employees. Fortunately, such disasters, resulting from flagrant disregard of occupational health precautions, are unknown today.

The effectiveness of control measures was demonstrated by a recent Public Health Service survey of potential health hazards involved in the construction of a dam and hydroelectric power plant near Pierre, S. D. In the tunnel construction, workers were exposed to dust containing free silica, welding fumes, such gases as carbon monoxide and oxides of nitrogen, solvents including tri- and perchloroethylene, noise, x-rays, and materials which can cause dermatitis. While not all of these exposures were evaluated, a check of the control measures in use indicated that most of the potentially hazardous conditions would produce only minimal bodily damage, if any at all. This

Presented at the Sixth Conference on Industrial Hygiene and Air Pollution, sponsored by the University of Texas and Texas State Department of Health, Austin, Texas, Dec. 3, 1960.

Chief, Division of Occupational Health, U.S. Department of Health, Education, and Welfare, Public Health Service, Burea of State Services.

Submitted for publication, Jan. 13, 1961.

project involved a greater variety of hazards than that at Gauley Bridge, but because of the safeguards, men could work without endangering their health and lives.

With increasing tunnel construction, more attention is being focused on the problems of working under increased atmospheric pressure. The city of Detroit has been especially active in looking into this problem because of its heavy construction program. Officials of the Detroit city health department have been concerned that rigid application of schedules for decompression can make construction economically prohibitive. Recently, they met with representatives of the Public Health Service and the U. S. Navy to seek new ways to assure safe working conditions for construction activities where workers are exposed to above-atmospheric pressure. At present, work is being carried out on the development of what is hoped will be more adequate and realistic standards that may serve as useful guides to those confronted with such problems.

In most areas sewer construction does not involve working under high pressures, but problems are encountered from noise; gases, such as carbon dioxide, methane, and carbon monoxide; dust; and variations in temperature and humidity. In addition, lack of oxygen has been blamed for some incidents in underground areas which may well have been caused by an excess of carbon dioxide.

Highway, Street, and Bridge Construction

Another segment of building activity which has increased tremendously during recent years is highway, street, and bridge construction. During 1959, about 270,000 persons were engaged in such construction.

One of the hazards associated with such work is illustrated by an incident that took place during the construction of the Mackinac Bridge, in northern Michigan. Four of eight workers using red lead paste on the suspension cables developed lead poisoning. These men had violated some of the basic lead-handling techniques in spite of the protective equipment available. On this same project, one diver died while in a decompression chamber because he had remained under water too long and failed to follow the proper time limits for ascending.

Highway construction similarly calls for vigilance because a number of environmental factors are involved. These include (1) dust from the operation of earth-moving and road-grading equipment; (2) gases such as oxides of nitrogen from diesel-powered equipment and from blasting; (3) oil mists from spraying forms; (4) vapors and fumes of asphalt and solvents if black top is used; and (5) dermatitis from contact with cement. In addition to these chemical hazards, workers are exposed to physical agents, such as noise from a variety of heavy road-building equipment and drilling operations prior to blasting; vibration from jackhammer drills; extremes of temperature and humidity; and ultraviolet radiation.

An area often overlooked, which causes considerable difficulty and lost time, is exposure to poison ivy and poison oak, and insect and snake bites. In fact, occupational dermatitis from poison ivy and oak has been one of the chief causes of lost time among surveying parties employed by the Bureau of Public Roads and the Coast and Geodetic Survey. To reduce the incidence and severity of these cases, effectiveness of a new preventive medication has been studied by the Public Health Service at the request of the U. S. Department of Commerce.

Building Construction

Despite the importance of various types of tunneling, as well as highway, street, and bridge projects, the hard core of construction activity remains building construction. Two million workers, the largest group of employees in the construction field, are employed in all types of building construction. Here there is a variety of potential occupational health problems. Among these, the carrying of heavy loads of brick, stone, mortar, and debris may result in bruises, calluses, and other injuries. Occasionally, structural changes involving the shoulder blade, neck, and thorax are brought about by bearing weights continually on one shoulder.

Exposure of excavation workers to varying weather conditions, such as heat, cold, and dampness, may result in chilblains, frostbite, sunburn, eczema, and other diseases common to outdoor workers. In addition, contact with organisms in the soil provides an opportunity for tetanus infection.

Carpenters who carefully avoid unsafe practices which produce wounds, cuts, infections, and calluses may still lose work time because of skin eruptions from irritating woods.

A common hazard among bricklayers, stone masons, plasterers, cement mixers, and others who handle cement and concrete is the so-called "cement worker's itch," a dermatitis due to the earthy bases of calcium, and to sulfuric acid, chromate, and alumina in cement. Wet cement and dusts including cement accounted for one-third of the dermatitis cases reported from the construction industry in California in 1958. The inhalation of cement dust may

also cause ulceration of the mucous membranes in the nose and mouth.

The advent of cement-finishing machines in recent years created additional exposures to noise as well as to carbon monoxide and other products of combustion from this gasoline-powered equipment. Also, in the past few years, reusable concrete forms have become standard equipment. These are usually constructed of plywood and must be sprayed with an oil to aid in separating the form from the poured concrete, a technique creating exposure to oil mists. The type of oil used may vary from a good grade lubricating oil to used automobile crankcase oil, which can contain traces of gasoline, including tetraethyllead.

The highest incidence of injuries among construction jobs reported for 1958 was in roofing and sheet metal work, with an injury frequency rate of 44.8. In addition to the danger of traumatic injury, several occupational health hazards are present.

Roof construction on many office buildings and industrial plants consists of layers of tar and asphalt roofing paper, topped with a coating of tar covered with gravel. Workers are exposed to asphaltic compounds and solvents during application of this hot material. While this is generally done out of doors, exposures may be hazardous under certain climatic conditions because many asphaltic compounds and residues contain carcinogenic agents. Similar exposures may occur when hot asphalt or tar is used for waterproofing underground portions of buildings and joints between concrete slabs. Contact with tar in the roofing processes is a source of photosensitivity and dermatitis. The handling of creosoted shingles may also produce dermatitis.

Structural steel workers, too, are subject to hazards other than accidental injuries. Impurities such as arseniuretted or phosphoretted hydrogen in acetylene may result in systemic poisoning or affections of the skin of acetylene welders. Intense ultraviolet rays released during electric welding or cutting are injurious to the eyes. In addition, metal fume fever and cadmium poisoning can be caused by cutting or welding metals coated with zinc or cadmium and may occur in demolition as well as during new construction.

In 1943, cases of lead poisoning among a group of workers dismantling an old elevated railway structure were investigated by the Massachusetts Division of Occupational Health. Fourteen men, using oxyacetylene torches, cut the steel girders into sizes suitable for use as scrap metal. Even though this work was done out of doors, practically all the men were ill at one time or another with some slight or major symptoms of lead poisoning. Similar incidents, involving old structures which have been given many coats of red lead paint over the years, are reported in the literature from many other States. The danger of lead poisoning is sometimes lessened by the substitution of aluminum paint for paint containing red lead as a protective coating on structural steel.

The use of special corrosion-resistant coatings on steel pipes and certain types of ductwork has increased in recent years. There is a tremendous variety of coating materials which may be used on steel. Some of these materials are polystyrene, phenol-formaldehyde, plastics containing chlorine, fluorocarbon polymers or resins, and coatings containing appreciable amounts of nitrogen. When heat is applied to these coatings, such as during welding, cutting, or burning, hazardous thermal decomposition products may be produced. While most of these hazards occur during maintenance operations, they could occur during construction.

Among plumbing and heating subcontractors, lead poisoning is perhaps the commonest occupational illness. The widespread use of copper for water, gas, and some drain lines has increased this hazard. Large quantities of lead are melted and poured to seal joints in waste lines and to solder sections of copper pipe. Litharge is used to seal joints and fittings for sanitary fixtures.

New potential health hazards are introduced by some of the new types of insulating materials which have been developed for heating and air-conditioning systems. One of these new materials—polyurethane plastic—can be extremely dangerous unless the resin is cured completely. Otherwise, while cutting, sawing, or otherwise applying this insulating material, workers may be exposed to vapors, usually toluene diisocyanate, which is not only a powerful eye, skin, and lung irritant but also a sensitizer.

Glass fiber insulation can also cause health problems, usually in the form of dermatitis or "glass itch." Adhesives used to fasten these insulating materials to ductwork or other surfaces may create additional problems. Some of the newer adhesives, for example, contain epoxy resins. These resins are sensitizers and are also extremely irritating to the skin and have caused numerous cases of dermatitis among workers handling them. Solvents contained in these adhesives can cause internal damage from inhalation of their vapors and dermatitis from skin contact. Similar exposures may exist in laying asphalt or vinyl tile floors.

Of all those engaged in building construction, painters are exposed to the greatest number and variety of skin irritants. The majority of interior finishes used today consist of polystyrene latex emulsions, alkyd, and acrylic resins suspended or dissolved in suitable solvents. Many exterior paints and primers contain lead, and some primers contain zinc chromate.

Since spray painting is prohibited by most union contracts, paint is normally applied by hand brushing. Thus, hazards are minimized except where large quantities of paint are mixed. In such instances, the exposure is confined generally to one man. Unless proper personal hygiene is practiced, however, there is the danger of lead poisoning from paint ingestion. Of course, when paint is applied by spray gun, workers are exposed to mists containing paint pigments as well as greater concentrations of solvents than would arise from hand brushing operations.

A new painting technique—airless spray painting—was introduced just a few years ago. In this process paint is heated and forced out of a nozzle under high pressure. About a year ago health hazards involving this operation were investigated in a government building located in Washington, D. C. Workers were exposed to high concentrations of finely divided paint pigments and solvents. In addition to hazards from inhaling pigment and the vapor from various solvents, serious fire and explosion hazards may result from sparks or flames unless there is adequate ventilation and the spray equipment is properly grounded. This technique is becoming increasingly popular in regular maintenance programs because of its time-saving features. Thus, it is important that necessary safeguards be provided and utilized.

Paper hangers are in danger of contacting dermatitis from aniline dyes or chromium compounds in the wallpaper. Arsenical dermatitis and lead poisoning from coloring materials were formerly common among this group of workers. There is still a danger in removing old wallpaper containing arsenic and lead because of the dust created. This operation can be made safer by moistening the paper before it is scraped off. Other potential irritants in wallpapering processes are ammonia, which is used in washing wall surfaces, and turpentine, used for adding strength to paste.

In addition to these strictly occupational health problems, it should not be overlooked that certain conditions, such as unsanitary and overcrowded facilities often found in temporary construction camps, can adversely affect health. As a result of such conditions, workers may contract contagious diseases, such as scabies, impetigo, and ringworm.

What Lies Ahead?

In considering what prospects the future holds for occupational health in the construction industry the first factor is the population at risk. Construction is predicted to grow at a fantastic rate in this decade. This obviously means a greatly multiplying corps of workers, who will be exposed not only to now existing hazards but also to dangers inherent in any new technologic developments affecting the construction industry.

Evidences of this burst of construction activity, together with demolition work preceding new construction, are undoubtedly discernible in most major cities in this country. Based on the experience of insurance companies underwriting workmen's compensation coverage, demolition work subjects workers to much greater danger of life and limb than most industries. For this reason, the U. S. Department of Labor has issued a hazardous occupations order, which prohibits the employment of minors under 18 years of age in demolition and related work.

In the District of Columbia, construction accidents accounted for nearly 40% of the increase in the number of disabling injuries reported in 1959, compared with 1958. Several construction deaths in past months have pointed attention to some of the safety problems in the industry. The District's industrial safety director has attributed the accidents to the attitudes of both employers and employees. He summed up the attitude of contractors as lacking in "the acceptance of responsibility to meet the law without having to have it continually pointed out." Concerning employees, he observed that sometimes employers comply fully with the safety code in providing all the required safety devices only to find that some workmen will not use them.

This reluctance of workers to take simple precautions is far from uncommon. There are the familiar cases where iron workers have walked off a job rather than haul planks for their own safety; where steel helmets have been discarded on projects where heavy falling objects could cause damage; where life preservers have lain on the pier unworn by bridge builders because hot weather makes them uncomfortable; and where safety belts and protective railings have been ignored.

Often it is found that the older experienced workers take more chances through a false sense of security. Another factor contributing to safety problems is the influx of many inex-

perienced workers with the boom in the construction industry.

How to Meet Our Problem

The establishment of industrial hygiene and safety engineering control measures, strict adherence to safe practices, a cooperative industry-labor approach to the problem, and the development of training programs for employees would contribute substantially to reduction of the occupational health and safety problem in the construction industry.

There is an occupational health maxim that every operation, no matter how potentially hazardous, can be made safe. In the United States, concern with finding and controlling these hazards has expressed itself through the work of various groups, including universities, insurance companies, private research organizations, and governmental agencies. Most states have an occupational health agency, usually located in the state health department, which is ready to provide assistance in the evaluation and control of any potential hazards. At the request of these state agencies, the Division of Occupational Health of the Public Health Service welcomes opportunities to participate in industrywide studies or to help in the solution of any complex problems.

The importance of joint management-labor effort and training should also be stressed. One useful device has been utilized by the DuPont Company. At every DuPont construction project "tool box meetings" of work crews are held for 15 minutes every Monday morning in the year. These meetings are intended to develop and maintain safety awareness. That such activities are worth while is suggested by the fact that the National Safety Council in 1960 credited the du Pont Company's Chambers Construction with the best all-time no-injury record in the construction industry. This record reveals 8,099,629 continuous man-hours worked without a single disabling injury.

An intensive educational program also contributed to the excellent safety record made by United States companies working on the St. Lawrence Seaway project between 1955 and 1957. Only 46 lost-time injuries were sustained during the more than 9½ million man-hours worked. The injury frequency of 4.80 represented only a fraction of the average rate for the construction industry.

The educational job must be continuous, not only to reimpress the older, experienced workers with the need for safety precautions, but also to orient the many new workers who are coming into the industry.

In conclusion, there are certain general methods, similar to those used in other industries, which can minimize occupational health hazards in the construction industry. Briefly, these measures include:

1. Adequate ventilation, either natural or mechanical, to dilute concentrations of gases, vapors, mists, dusts, and fumes to safe levels.
2. Use of wet methods to allay dust, especially in drilling, earth-moving, tunneling, and demolition of old structures.
3. Personal hygiene, including frequent washing of hands and body and changing of clothes, to minimize skin contact with oils, solvents, alkalis, and other materials.
4. Personal protective devices, including respirators, gloves, clothing, boots or shoes, protective ointments, ear defenders or muffs, and guards for the eyes.
5. Education. Many occupational diseases can be prevented if workers are informed about the nature of the potentially hazardous substances used and physical agents encountered, including the suitable protective measures for each situation.
6. Substitution of nontoxic or less toxic materials than are commonly used. Many electrical contractors, for example, use carbon tetrachloride for cleaning contacts prior to soldering. Other solvents can be used just as effectively.

Several federal and state agencies have adopted construction safety rules and regulations. While these deal primarily with accident prevention, many include occupational health hazards. In 1958 the U. S. Army Corps of Engineers revised its General Safety Requirements to include, among other items, a chapter on Poisonous and Harmful Substances. In the same year, the state of Maine adopted Construction Safety Rules and Regulations which include a section on Poisons, Hot, or Other Harmful Substances or Conditions. These and similar codes or regulations will serve as a guide to those who are responsible for the health of construction workers.

It should be emphasized that since most construction projects are conducted out of doors with ample natural ventilation, many of the hazards referred to here would probably be minimal. On the other hand, when work is done in confined areas, or especially during cold weather where much of the building is sealed against the cold, harmful amounts of these toxic materials may accumulate and endanger the health and perhaps lives of workers.

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Selection of Occupational Health Nurses

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IN A STUDY conducted in December, 1959, to determine the preferences of industrial physicians in the selection of the occupational health nurse, questionnaires were sent to 100 physicians who were Fellows of the Industrial Medical Association and Diplomates of the American Board of Preventive Medicine. Eight-four questionnaires were returned. They indicated that the industrial physician, who has considerable responsibility for the selection of the nurse in occupational medicine, prefers qualifications that are higher than are generally acceptable to nurses and other physicians. The preferences may be summarized as follows:

1. Age of about 30 (marital status has little significance)
2. Training beyond the minimum basic education
3. Some previous experience in occupational health
4. Experience in public health nursing
5. Proficiency in health counseling (this is considered more important than proficiency in x-ray and laboratory techniques)
6. High levels of social, mental, and professional development

Education of the Occupational Health Nurse

The responsibilities of the occupational health nurse in the one-nurse service or of the occupational health nursing supervisor are comparable to those of the public health nurse. Both must be self-directive or able to direct the activities of others. Both are actively concerned with complex programs for prevention of disease and promotion of health, as well as clinical and curative services. But the demand and the opportunity for education have not been the same for both nurses.

In cognizance of the level and complexity of her responsibilities, the public health nurse and her employer demand education which will prepare her to fulfill her role with competence, and appropriate rewards are provided for each level of preparation achieved. In recommending qualifications for the public health nurse in a staff position, the Public Health Nurses Section of the American Nurses Association specifies a Bachelor's degree and/or special study in public health nursing.[1] The recommended qualifications specified by the Occupational Health Nurses Section of the American Nurses Association indicate only that special training in occupational health is desirable, not that it be required.[2] The status of specialized education is reflected by the fact that there are only two programs, both at the Master's degree level, in occupational health nursing. Recognition and rewards similar to those given to public health nurses for additional education are not common for occupational health nurses.

Lacking motivation and education facilities, only a very small proportion of nurses currently engaged in occupational health nursing in the United States have a level of academic preparation commensurate with the responsibilities of their nursing practice. Of approximately 17,000 occupational health nurses, only 4.7% hold Bachelor's degrees and 0.6% have Master's degrees. Among public health nurses, 25.4% have Bachelor's degrees and 4.8% have Master's degrees.[3]

As a substitute for preparation in occupational health nursing, various types of experience are recommended, including work under supervision in an employees health service. With less than 50% of occupational health nurses having such supervision,[4] the opportunities for the unqualified nurse to have supervised work experience are limited. Many nurses, therefore, learn by trial and error on the job.[5]

Physician's Role in the Selection of a New Nurse

We can assume that the 84 medical directors of this study are busy physicians, with many administrative, medical, and legal responsibili-

This article is based on a questionnaire study for essay, presented to the Department of Public Health, Yale University, in partial fulfillment of the requirements for the degree of Master of Public Health.

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ties which cannot be delegated to ancillary personnel. In spite of this heavy schedule, many of these physicians indicated that they have the responsibility for selecting the nursing staff. In occupational health nursing, probably more than in any other nursing specialty, someone other than a nurse selects the candidate for a nursing position.

One of the physician's problems in selecting the nurse is keeping himself informed about changing patterns of nursing education. There is indication that, at least in a few instances, some confusion exists among the physicians of this study as to the difference between a degree in nursing and the title "Registered Nurse."

The title "Registered Nurse" or the letters "R.N." after the nurse's name designate licensure to practice as a professional nurse within the state (or other political entity) whose board of nursing examiners issues the license. There is no national license. Each state board has its own criteria to which candidates must conform. These criteria vary from state to state. Nurses who may apply for licensure by examination include those who have completed their nursing education in any one of the following programs:

1. The three-year training course, usually in a hospital school of nursing, leading to a diploma in nursing
2. The four-year or five-year collegiate program, in a college or university school of nursing, leading to a bachelor's degree in nursing
3. The recently developed two-year program, often in a junior college school of nursing, leading to the Associate in Arts degree (not all state boards will accept this nurse as an applicant for licensure as a professional nurse unless she completes additional, specific training)

There is provision in all states for licensure by reciprocity for those nurses already licensed in another state whose education meets the minimum standards required by the board of nursing examiners in the second state.

In relation to the possible misunderstanding of the physicians of this study about the difference between the degree and the "R.N.," one participant made the following comment: "I think it is possible that the majority of physicians who fill out this part [of the questionnaire] really do not know the difference and will likely make a mistake. In fact, I almost did and I presume to be more acquainted than others."

The Head Nurse's or Supervisor's Role

One way that the physician may effectively solve the problem of selecting the staff nurse is to delegate full responsibility for the choice and supervision of the nursing staff to a head nurse who, through graduate education and professional experience, has prepared herself to function optimally in all aspects of occupational health nursing supervision. Outside of graduate education, it is difficult for the nurse to acquire basic knowledge for the development of high levels of skill and ability commensurate with her duties as an effective supervisor, including the selection of the new nurse. Although 61% of the physicians who participated in this study indicated that they have head nurses, only 12% of these physicians reported that the head nurse has full responsibility for selecting new nursing personnel. Two physicians whose staffs include more than 100 nurses do not work with a nursing service administrator or head nurse.

The Role of Outside Agencies

Where the limited size of the staff makes a nursing supervisor or head nurse inappropriate, the responsibility for selecting the nurse cannot be delegated by the physician. In those establishments employing only one nurse, the physician has available to him, however, several consultant services. These are the professional counseling and placement service of the nurses associations, the state or local health department occupational health nursing consultant, and the insurance company consultant. They welcome the opportunity to assist him in selecting the nurse whose qualifications will meet the needs of his occupational health program.

Job Descriptions for Occupational Health Nurses

In selecting the nurse for occupational health service, consideration must be given to the role she is to fill in the total program. The job description of the occupational health nurse should spell out, for each level within the nursing service, not only the duties and responsibilities but also the medical, nursing, and administrative lines of authority. Based on the above, the job description should also contain the minimum requirements for employment at each level.

The Nurse's Role in Health Maintenance

Because of advances in environmental controls, occupational health services which are concerned exclusively with treatment of trauma have limited value to modern industry. The current stress on health maintenance programs to improve and prolong worker effectiveness necessitates the nurse's preparation for the role of health counselor. Such a role requires more education in communication techniques,

normal psychology, sociology, teaching methods, and industrial relations than is available in the present three-year basic training for nurses. To participate in the control of environmental hazards, she needs some knowledge of the principles of epidemiology. Much of this knowledge can be acquired in university schools of nursing.

Since academic preparation in the specialty is limited, the occupational health nurse-applicant's previous experience in occupational health is of value if it has been gained under qualified nursing supervision. The health counseling skills considered necessary for modern public health nursing are very similar to those used in the industrial milieu; hence, previous experience in a supervised public health nursing service can be considered good background for the nurse entering occupational health nursing. In both instances, experience under qualified supervision serves as the criterion for selection.

The majority of the physicians in this study preferred that the nurse-applicant have experience in public health nursing, as opposed to only 6% who preferred experience in an orthopedic service. This preference may be a reflection of the changing pattern of occupational health services from treatment of trauma to maintenance of health. Experience in x-ray and laboratory techniques was preferred by 25% of the participants, a smaller percentage than the 38% who reported that they have nurses with these skills on their staffs. There are no clues as to whether this reflects a trend to employ qualified technicians to perform these services, but the possibility is suggested.

Conclusion

To be realistic, we must accept the fact that the number of nurses with academic preparation in occupational health and the number of schools to educate them are growing slowly. We must, therefore, be prepared to utilize the graduates of the three-year program in occupational health services. Such nurses, without additional educational qualifications, can develop an adequate level of proficiency if they have the opportunity to work under qualified occupational health nursing supervision.

The occupational health nurse's responsibilities are many and varied. Unlike nurses in other specialties with similar responsibilities, she and her employer have not accepted the need for nor the value of special preparation.

It is hoped that in the future both occupational health physicians and nurses will urge their professional organizations to acknowledge the necessity for the occupational health nurse to be a mature person, with collegiate education and professional work experience which promote the development of the special skills and understanding basic to effective practice of occupational health nursing, in order to enable her to direct her own activities and those of others.

Summary

1. Questionnaires were sent to 110 industrial physicians who are Fellows of the Industrial Medical Association and Diplomates of the American Board of Preventive Medicine to learn their preferences with respect to the selection of an occupational health nurse. Eighty-four questionnaires were returned.

2. The responses indicated that these physicians prefer to employ nurses with capabilities beyond those which can be achieved in the standard three-year nurse's training program leading to a diploma and state registration (R.N.). A particular shortcoming in this basic training relates to an understanding of how to work in modern programs of prevention.

3. Because of the absence of a general policy in industry to pay higher salaries or give increased responsibilities to nurses with additional training, there is very little demand for graduate courses.

4. The author believes that inadequacies of training may be compensated for by work experience under the direct supervision of a qualified head nurse. The new nurse in industry, particularly if she is to work alone, should have such a background. Alternatively, she should have had advanced training or some supervised experience as a public health nurse.

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Prevention of Low Back Disability

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AT THE Hawthorne Plant of Western Electric Company, we initiated, 10 years ago, a selective placement program for male applicants and transferees assigned to heavy jobs. Selection of the proper person for the proper job, maintenance of the health of the employee, and reduction of the rising trend in frequency, severity, and costs of industrial back cases were the objectives which motivated the introduction of our program. Our early experience with this program has been published previously.[8, 9] Our methods of selective placement are based upon (1) an analysis of the abilities of the employee and (2) a detailed analysis of the demands of the job.

Essentials of a Disability Prevention Program

Prevention of industrial disabling back injuries has been attained by coordinated efforts of operating management and the medical department. The frequency and severity rate of disabling back injuries depend upon the universal interest of all branches of management in safe working conditions and are controlled by the following factors:

A. *Operating-Management Controlled*
   1. Provision of mechanized equipment
   2. Instruction of employees in proper and safe work performance
   3. Classification of jobs according to the requirements of physical effort expended on the job
   4. Adjustment of job to the employee's limited work capacity

B. *Medical-Management Controlled*
   1. Screening of applicants and transferees assigned to heavy work through preplacement examinations
   2. Instant vigorous treatment of all low back injuries regardless of degree of intensity of pain
   3. Immediate disability assignment for all employees complaining of low backaches
   4. Careful consideration of job assignment following completion of treatment of back injuries

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Clinical Screening of Applicants and Transferees

At the Hawthorne Plant, we share with other practitioners of occupational medicine the opinion that normal function of the spine is essential for any job assignment which involves heavy labor, work that requires lifting and carrying, stooping and bending, pulling and pushing. The normal functioning spine serves as a protective cover for the central nervous system apparatus imbedded in the spinal canal as the skull protects the brain. It provides, with the help of muscles and ligaments, firm support to the human body while bearing and distributing weight, acting either as a stiff immobile organ like the long bones of our extremities or as a pliable, flexible springlike mechanism deriving its elasticity from its separation of the spinal column into multiple bony segments. Supporting musculature capable of withstanding and enduring stress increases the strength of the back and promotes and sustains normal utilization of spinal functions when physical demands of the job require strenuous exertion. Undoubtedly, the most desirable physical conditions of the back in a worker with good health are (1) perfect bony structure, (2) adequate musculature, (3) suitable posture, (4) good body control.

These are the things we are looking for in our efforts to select the right man for a heavy job. Their presence helps us preserve the normal status of the working man. Medical scientists know a great deal about the function of the structural elements of the body. The unknown factors are the physiological and psychological qualities and possibilities of this machine called the "human organism" in regard to expanding strenuous physical effort.

It is true that mechanization and automation have greatly reduced the demands on muscular strength; however it is equally true that in addition to horsepower and electronic power man's muscular power and endurance is still a necessary factor in the accomplishment of our daily work. We know very little about the in-

tricate mechanics that cause sudden stress or strain on the structures of the back during the performance of routine work; we cannot determine to what limits each individual can use muscles, ligaments, and joints of his body, All the knowledge concerning the effect of heavy work upon the spine that is shared by medical and nonmedical men is based on experience. Decisions, therefore, greatly depend upon empiricism, common sense, and some degree of intuition rather than upon scientific data. Working conditions and working standards for jobs requiring great stress and strain have been established on the basis of time studies, without giving due consideration to the physical capabilities of the individual. Basic information about the potential strength of the back is missing. An exception to this is the studies that have been made to determine the pressure which is exerted upon the intervertebral disk of the lumbosacral joint during movements of the spine.

In his studies on the mechanics of the spinal column and the effect of the movements of the spine upon the intervertebral disks with and without carrying weight, Hans-Henning Matthiass[3] found that in a 30-year-old man 6 feet tall and weighing 200 pounds the pressure exerted upon the intervertebral disk of the sacrolumbar joint in an upright position, not carrying any extra weight at all, is approximately 134 pounds (Fig. 1). The pressure is caused by the weight of the trunk, the head, the upper extremities, and the tension of the muscles of the back and abdomen. When the same person bends forward 10 degrees without carrying any weight, the pressure at the sacrolumbar joint increases about 123%, the tension of the back muscles being 21 times greater than in the upright position. Fig. 2 shows the enormous increase of pressure which is exerted at the disk of the sacrolumbar joint during forward bending to an angle of 90 degrees without carrying weight and with carrying an object weighing 65 pounds.

These facts illustrate that it is of utmost importance to adopt the most economical motion for job performance as well as to select, prior to their assignment to a heavy job, employees whose physical conditions signify optimum function of the spine.

Our program has been limited to heavy jobs. There are few scientific data available upon which the determination of light and heavy work could be based. The amount of weight which can be handled manually varies considerably with each individual. Our observations have taught us that the maximum allowable weight limit for workers in need of a

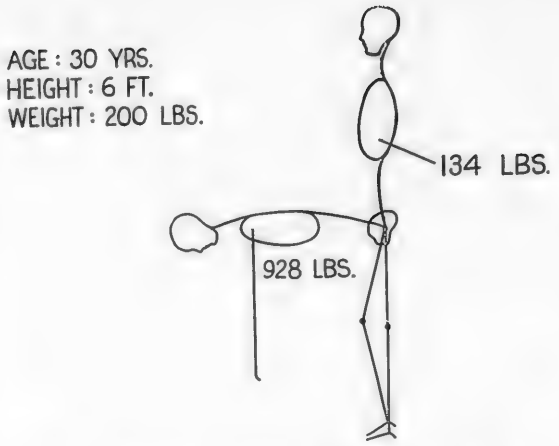

Fig. 1—Pressure exerted at lumbosacral disc of man, 30 years old, 6 feet tall, weighing 200 pounds, without carrying weight. Upright position and 90° forward bending. (From H. H. Mattiass: Arbeitshaltung und Bandscheibenbelastung.)

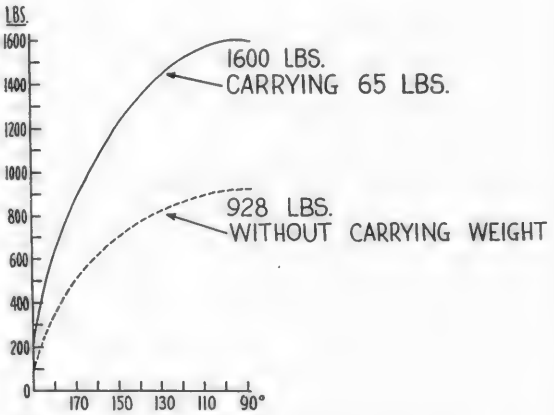

Fig. 2—Pressure exterted at lumbosacral disc of man, 30 years old, 6 feet tall, weighing 200 pounds, on forward bending without carrying weight and carrying 65 lbs. (From H. H. Mattiass: Arbeitshaltung und Bandscheibenbelastung.)

weight-lifting restriction should not exceed 35 pounds. For the purpose of job classification, we at Hawthorne declare as heavy work a job which calls for lifting or carrying objects weighing from 35 to 100 pounds for more than 30% of the working time, or an equal exertion of pulling or pushing.

When matching the physical characteristics of workers with the physical demands of the job, one has to bear in mind that physical performance of an individual is a unit reaction. Therefore it is necessary to estimate the functional efficiency of the whole organism in selecting employees for a particular job.

Clinical Findings Sought

Our estimation is based upon a complete examination which includes the following:

1. Personal history interview. This relates to previous illnesses, back ailments, operations, injuries, and work experience. Keen observation and interrogation while taking history may disclose the prospective employee's emotional background. His vocational interest and his past performance during work and leisure activities indicate his true desire and willingness to do heavy work. Information elicited during this interview reveals the attitude of the prospective employee toward his particular job assignment and is considered the most important factor for his psychological evaluation.
2. Body inspection. This determines the following factors:
   a. Body control—revealed by careful observation of the employee's activity, his manner of walking, sitting, getting up, standing, and removal of shoes and clothing. Limping and cautious or guarded movements of the spine and of the extremities are notable items in the final estimation of the employee's capability to perform his assigned task.
   b. Body type. Men of normal body type—a well-proportioned body of moderate length and breadth—or of stocky type—heavily built with large muscles, large and heavy extremities—are considered to be the best candidates for heavy work. Neither great overweight nor underweight is desirable. A small and delicate or tall and slender person with long and narrow torso and small muscles representing the slender body type has less value for occupational success when assigned to a heavy job.
3. Physical examination. Posture, curvatures of the spine, pelvic tilt, length of legs, and chest expansion are recorded. The motion of the spine in standing and sitting position is tested. All nerve, muscle, and tendon reflexes are checked. The general health examination includes a careful examination of the heart and circulatory system, an examination for umbilical, femoral, or inguinal hernia, and a routine urinalysis. Urinary findings deviating from the norm need additional investigation to ascertain the origin of the abnormalities. Systemic diseases such as diabetes and kidney disorders may require weight-lifting restrictions and therefore render the employee unfit for his assignment. Testing of vision is required for all workers assigned to heavy lifting. Heavy lifting may aggravate a preexisting degenerative myopia through venous congestion and increased ocular tension with resulting complications, the most important being retinal detachment. When the diopter lens correction needed to bring the person's vision to near normal is greater than –4, we consider him unfit for heavy work.
4. Special tests. Straight leg raising tests, Fabere-Patrick tests, Ely's heel-to-buttock tests, and passive hyperextension of both legs are carried out to detect clinically any pathologic condition of the lower back. Muscular fitness tests determine muscular strength and endurance of the muscles of the back and the abdomen. A candidate for heavy work should possess adequate musculature, already conditioned, or there should be definite indications (age, build, etc.) that conditioning on the job can be achieved.

Disqualifying Clinical Findings

The clinical findings disqualifying a man for an assignment to a heavy lifting job or a job causing unusual stress on the lower back include the following:

1. History of significant or recurrent back ailments or injuries or serious back surgery (laminectomy, fusion, tumors, etc.)
2. Significantly subnormal muscular or skeletal development, significant underweight for height and frame, or overweight with heavy abdomen
3. Spasm, tenderness, or rigidity of the spine on bending
4. Defects of spine or legs which cause significant imbalance of body weight
5. Marked scoliosis
6. Marked tilting of pelvis
7. Marked kyphosis
8. Positive straight leg raising test (sciatic irritation)
9. All positive abnormal neurological findings of lower extremities
10. Hernia
11. Systemic disorders such as significant cardiovascular conditions, severe varicosities, high myopia
12. Emotional disorders identified by unwillingness to do heavy work, lack of vocational interest, lack of ability to overcome minor strain, psychotic trends

X-Ray Findings Sought

Of greatest importance in our routine examination are the x-ray studies of the spine. In our x-ray examination of the back, we have generally used three different views of the lower spine: anterior-posterior and lateral views of lower thoracic, lumbar, and sacral spine, including pelvis (14 × 17 inches), and a special view to demonstrate the sacrolumbar joint. Oblique views are taken only when indicated, i.e., in cases of defect of pars interarticularis, degenerative changes of apophyseal joints, or asymmetry of articular processes.

A critical evaluation of all findings, clinical as well as x-ray, has to follow the completion

X-Ray Findings of the Lumbar Spine Among Male Applicants and Transferees Assigned to Heavy Work

Percentage Distribution of Diagnoses, by Decisions For and Against Heavy Work: 7,729 men, 1950-1959

Diagnoses	Decisions Made: Heavy Work Permitted (%)	Decisions Made: Heavy Work Prohibited (%)	Totals (%)
No pathological findings	32.0	....	32.0
Osteoarthritis	2.5	2.4	4.9
Spondylolisthesis, spondylolysis	....	4.2	4.2
Scoliosis	9.5	2.2	11.7
Schmorl's nodes	3.0	0.5	3.5
Epiphysitis	0.3	....	0.3
Spina bifida occulta of sacrum	11.2	....	11.2
Old traumatic pathology	0.5	2.2	2.7
Incomplete sacralization, lumbarization	....	5.0	5.0
Increased or decreased lumbosacral angulation	5.2	1.0	6.2
Narrowing of intervertebral disc space	3.5	1.5	5.0
Combination of several abnormalities or clinical findings	....	4.6	4.6
Poker spine	....	3.6	3.6
6 lumbar vertebrae	4.0	....	4.0
4 lumbar vertebrae	0.3	....	0.3
Lumbar ribs	0.8	....	0.8
Total			100.0

of the preplacement examination. Such an evaluation must be individualized. The frequency of some of the structural changes which can be found in the x-ray films of the lower spine and our evaluation of these findings in regard to a man's fitness for heavy work are shown in the accompanying table.

An analysis of the x-ray examination of the lower back of our applicants has enabled us to compile a list of x-ray findings which we consider of minor significance and another list of findings which disqualify potential employees from assignment to heavy work.

Any one of the following x-ray findings may be considered of minor significance and usually does not disqualify for heavy lifting jobs, or jobs causing unusual stress on the lower back. These findings must be evaluated in connection with the clinical findings, giving due consideration to age, previous history, and body type. If there is a combination of two or more of the following, clinical judgment should be used regarding their combined significance.

1. Mild scoliosis
2. Mild increase or decrease of lumbar lordosis
3. Moderate increase of sacrolumbar angulation
4. Narrowing of the fifth lumbar interspace when unaccompanied by other findings
5. Spina bifida occulta of sacral segments
6. Complete sacralization of lumbar vertebrae (the last lumbar vertebra is fused in whole)
7. Complete lumbarization of lumbar vertebrae (the first sacral segment has become a separate segment and has the appearance of the last lumbar)
8. Lumbar ribs, or un-united transverse processes
9. Minor epiphysitis
10. Incomplete ossification of the epiphyseal line in a person less than 25 years of age
11. Minor anomalies of transverse processes or articular facets
12. Centrally located Schmorl's nodes

Disqualifying X-Ray Findings

Any one of the following findings revealed on x-ray study disqualifies a worker for a heavy lifting job or a job causing unusual stress on the lower back, regardless of clinical findings.

1. Laminectomy, fusion, or presence of radiopaque material in the spinal canal
2. Bone or joint lesions of destructive or formative nature, such as osteoporosis, osteochondritis, osteitis cystica, spondylitis, and tumors, or any other pathologic change suggesting fragility and weakness of osseous structure
3. Marked scoliosis with rotation of vertebrae
4. Kyphosis of the lumbar spine
5. Marked increase of lumbar lordosis which is usually associated with increased sacrolumbar angulation
6. Marked decrease of lumbar lordosis, flattening of the lumbar spine—poker spine
7. Marked narrowing of the intervertebral joint space, particularly at the sacrolumbar joint
8. Transitional vertebrae
   a. partial fusion of last lumbar vertebra with the sacrum
   b. separation of the first sacral segment with unilateral fusion
   c. unilateral or bilateral articulation of the transverse process with the sacrum
9. True spina bifida, or spina bifida occulta, of lumbar vertebrae
10. Advanced arthritis of any type
11. Moderately advanced osteoarthritis if in excess of the average usual findings in relation to age
12. Spinal deformities due to old fracture of vertebrae or old healed infectious disease
13. Spondylolisthesis
14. Defect of pars interarticularis without "slipping" forward (prespondylolisthesis)
15. Marked variations of apophyseal joints (unstable facet structure)
16. Multiple Schmorl's nodes when eccentric or associated with an undulating appearance of the surfaces of the vertebral bodies
17. Marked deformities due to residual epiphysitis
18. Infectious diseases of vertebrae (tuberculosis, osteomyelitis)

Clinical Management of Back Cases

Each case of industrial back injury, regardless of the degree of disability, requires the application of the most effective method of treatment. Every effort has to be made to prevent a minor nondisabling back disorder from becoming a serious disabling back condition. We pay attention to all complaints of low backaches; we start treatment immediately and treat intensely. When such treatment consists of pain-relieving medications, muscle-relaxing medications and applications, mental alleviations, and work mitigations, we have created the most favorable condition for early recovery. When an unstable back is combined with emotional instability, various complications can develop which may prolong the most effective treatment.

Back ailments resulting from aggravation of a preexisting pathologic condition or caused by direct trauma such as a fall or a blow rarely present any therapeutic problem. Exceptions are mainly in cases involving unresolved claims for compensation.

For all acute back sprains which show evidence of muscular spasticity, we prefer among the methods of conservative therapy initial applications of moist heat. We are using moist air or hot moist compresses followed by rest and light massage. Occasionally we make use of injections of anesthetics if trigger points of tenderness can be found. In many of our back cases, we recommend the wearing of a lumbosacral support, for temporary use only, made out of flannel with two light corset stays in back. The wearing of such a support helps to relieve the muscular spasm, the stabbing pain, and the feeling of insecurity. As a result, ambulation is possible where otherwise bed rest would be necessary.

After a few days of treatments with moist heat we may select other kinds of physical therapy, such as ultrasound, microtherm, short wave, infrared radiation, or ionization. A program of exercises for strengthening abdominal and back muscles is instituted as soon as indicated. Intramuscular injections of muscle-relaxant medications appear to be more effective than oral preparations. We have no definite preference for analgesics. Work restrictions limiting the employee's activity to light work are put into effect in each case of low backache immediately after the first visit to our dispensary. Such disability assignments remain in force until complete recovery has been achieved. In a small number of cases, repeated attacks of low backache make permanent work restrictions necessary.

Results and the Program

Physical examination to determine the fitness of a prospective employee, selective placement, and early intensive treatment of all low back disorders are the methods we have been using for the past 10 years. We believe that these constitute the best positive approach to the prevention of back disability in industry. Our standards for measuring the fitness of an employee exposed to strenuous exertion appear to be adequate for our manufacturing plant. Such standards may vary in different organizations depending upon the kind of work required. During the years 1950-1959 selective placement examinations have been done for 7,729 men assigned to heavy jobs. Approximately 75% were applicants, and 25% were employees scheduled to be transferred from light to heavy work. After the evaluation of findings on their examination, 71% were found able to do heavy work and 29% were declared unfit for heavy work.

To illustrate the effect of our preplacement

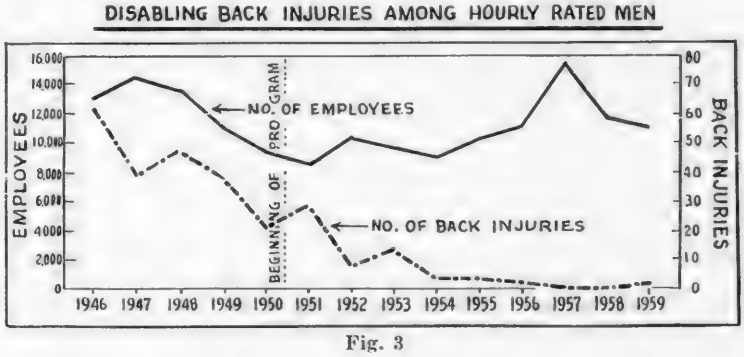

Fig. 3

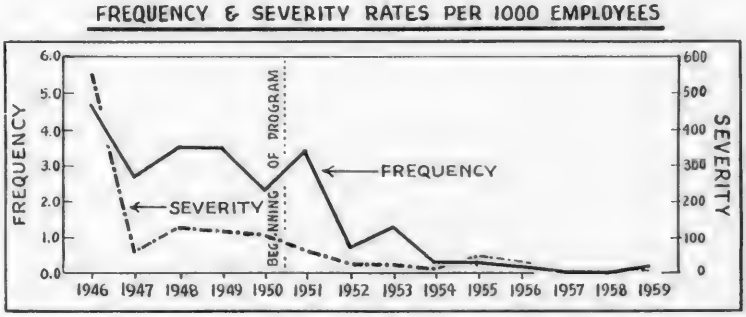

Fig. 4

program, we have used the frequency and severity rates (Figs. 3 and 4) of our disabling back injuries during the last 15 years, a standard method which is recognized as the best criterion to evaluate the safety and health controls of an industrial organization. The number of disabling back injuries among our hourly rated men has steadily declined since the introduction of our program in May, 1950 (Fig. 3). In 1959, we had only one "lost-time" case due to back injury on the job. During the past 15 years, the disabling back injuries at our Hawthorne Plant decreased 95%; according to statistical data from the U.S. Bureau of Labor for the year of 1958 the relative frequency of all disabling work injuries in the United States decreased during the same period of time 35%.

An analysis of the severity rate of our disabling back cases shows a similar significant reduction. When we started our program, the severity rate was 115; in 1959 it had dropped to 1. Compiled results reflecting frequency and severity rate of the disabling back injuries at our Hawthorne Plant during the last 15 years have proved the desirability of a preplacement examination program as an effective approach to reduction of low back disorders in industry.

We believe, however, that a review of our preplacement program would be incomplete without an analysis of the current nondisabling back injuries. Regardless of the kind of methods that are used to control the selection and placement of workers, compensable low back disorders can never be eliminated. Among our plant population of more than 20,000 persons, we see in addition to the small number of disabling back injuries a great number of nondisabling back cases. Using pertinent data for the year of 1959, we found that our nondisabling back injury experience compares favorably with available figures in 1957 and 1958. The number of hourly rated shop men who were in our employment during 1959 performing various kinds of laboring duties, skilled and unskilled, light and heavy work, was 11,568. The percentage of those who had occupational nondisabling back injuries was 1.2%. Such injuries occurred among men in every age bracket:

Under 20 years	20-29	30-39	40-49	50-59	60-65
3%	23.6%	24.7%	27.5%	15.5%	5.7%

Of the 139 men reporting back injuries in 1959, 75% had their first experience with low backaches, 25% had chronic recurrent back conditions. Physical examination of these employees who were complaining of low backaches of sudden or gradual onset which they attributed to their work or a specific incident at work revealed positive clinical findings in 78% and no clinical findings in 22% of the cases. All of them were treated conservatively. Their average time of treatment was 15 days, and the average duration of disability assignment, 17 days.

A comparison of the incidence rate of our occupational nondisabling back injuries among 11,568 hourly rated men in 1959 with the experience among 10,318 hourly rated men in 1955 demonstrates a marked reduction from 279 cases, or 2.7%, in 1955 to 139 cases, or 1.2%, in 1959.

Included in the number of 11,568 hourly rated men who were employed at Hawthorne during 1959 is the group of 1,456 shop men assigned to duties classified by us as heavy work. All of these men had passed their preplacement examination at some time in the past. When we analyzed their back injury experience separately, we found that the percentage of occupational nondisabling back injuries among these employees in 1959 amounted to 0.34%. After a short period of conservative treatment and disability assignment, all men returned to their regular job duties, which require heavy lifting and carrying, pulling or pushing.

When we initiated our selective placement program, we were not considering the monetary benefits accruing from such a program. It is obvious, however, that the financial advantage obtained through a reduction of frequency and severity of back injuries is a most appealing attribute. The costs of a disabling back injury may vary considerably depending upon the individual case. In comparing costs of disabling back injuries during a five-year period without preplacement examination with a five-year period requiring such examination, we found that in the latter period the reduction of costs of disabling back injuries per million hours worked by shop men was 71%.

During the past half century, medical research has contributed a great deal to a better understanding of the physiology and pathology of the spine. Increasingly, we have learned to recognize the importance of the emotional factors motivating an individual's action. If, in the future, we gain a better scientific knowledge of the physical and psychological factors regulating the functions of the human body, if we are better able to evaluate stress and strain which are imposed upon the worker, if we can reduce muscular fatigue and improve the efficiency of work within the limits of the possibilities of the human body, we may be in a better position to design additional adequate

scientific safeguards of health which could further prevent back injuries in industry.

Summary

A preplacement examination program to determine the physical fitness of prospective employees has been conducted at the Hawthorne Plant of Western Electric Company since 1950. The need for practical preventive measures to control the increase of disabling and nondisabling back disorders has induced the initiation of this selective placement program. Its design and subsequent development, including the criteria for evaluation and the methods of job classification, have originated from many years of observation of work operations and clinical experience obtained through examination and administration of medical care to occupational and nonoccupational back injuries among a plant population of more than 20,000 employees. A special examination is mandatory at Hawthorne only for hourly rated men assigned to heavy work, be they newly hired employees or employees transferred from light to heavy work. A marked reduction of frequency, severity, and costs of low back injuries has followed the introduction of the program. Matching the physical characteristics of workers with the physical demands of jobs prior to job assignment and applying sound medical judgment and strenuous effort to alleviate physical and mental distress at the onset of low back disorders are used as an effective approach to the solution of the problem of the industrial back. Modifications of such a preplacement program may be indicated in other industrial organizations depending upon job requirements and the general working conditions.

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Mental Health in Industry

Louis Belinson, M.D., Jefferson City, Mo.

MENTAL health is an all-inclusive term; mental—a word which tends to induce anxiety—and health—a word which can today be construed as an anxiety reducer. Though we may speak quite freely about mental health and mental illness, we cannot actually separate the two. Both health and illness are parts of the same state of adjustment and stability of the individual. The subject today follows the advent of pioneering studies in the field of human behavior. Medicine has for many decades been concerned with the toxic and environmental hazards of workers and has stimulated industry to concern itself with better physical protection of workers.

Contributions

During World War I, the effectiveness of workers in England became the concern of the government, and studies were done in the area of sociological and psychological aspects of the various types of jobs.[3, 10] In this country, one of the early references to the employment of a psychiatrist in industry was in 1916, when the operators of a silk mill sought to evaluate the emotional adjustment of the workers.[5] Three years later, the Engineering Foundation of New York designated a psychiatrist, Dr. Southard, to do a careful analysis of some 4,000 cases. He reported that social incompetence rather than occupational incompetence brought about the discharge status of 62% of the workers.[1] Russell Frazer in a survey of the mental health of more than 3,000 workers from 13 different factories (in Great Britain) found that from one-fourth to one-third of absenteeism was due to illness caused by nervous disorder.[11] The Metropolitan Life Insurance Company added a psychiatrist in 1922.[5] In 1925, a Dr. V. V. Anderson analyzed the personnel of a large New York department store and reported that 20% of the group could be called problem cases, owing to maladjusted personalities, poor physical condition, or disability for the particular jobs to which they were assigned.[2]

Perhaps the outstanding series of studies were the contributions of Elton Mayo and his associates from the Harvard School of Business Administration. To his group, we owe the present day practice of "rest periods." Initially, this modification in working conditions was intended for workers whose jobs had a high degree of monotony. The most significant value of his work at the Hawthorne (Ill.) Plant of Western Electric, some 32 years ago, was the concept that human interrelations are an integral part of the work situation.[3] The plant operates in both an economic area, bringing forth a product, and a social area, where there is created and distributed job satisfaction. For effective and productive plant operation, then, we have a triangle with (1) the structure, (2) the culture, or climate, and (3) the personality of the worker firmly linked together.

Organizational Structure

While it may tend to clarify our thinking to delineate a progressive movement as if it occurred as an isolated phenomenon, we must ever be mindful of the fact that there are many developments which contribute concurrently and make specific advances possible. I am now referring to the entire field of administration and management. It was not too many years ago that the great majority of our larger organizations were autocratic in administrative operation. The individual family or group who owned the organization or plant or factory were primarily concerned with the success of the operation as measured by profits and the necessity, of course, to protect the investment. It was only when management became more democratic—that is, when more individuals

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began to share in the total administration of the organization—that the interrelations between individuals began to enter the thinking and planning for the total program.

We owe much of our present understanding of administrative structure and organization to the field of political science. Here we find that, by virtue of political expediency and changes in political fortunes, organizations had to be built, dissolved, and rebuilt every one or two or four years. While they were political organizations, they contained the inherent structural relationships of any organization. Political science gave us the organizational plan with its chain of command and channels of communication. This was the beginning of a vast body of knowledge which now has accumulated through experimentation, research, and practical application.

This was followed by the development of scientific management, which provided us with the concept of job descriptions with its levels of authority and levels of responsibility and statements of qualifications and experience. It made possible the recruiting of the right man for the particular job.

With this background, the field of psychology added its skills and contributed the role that the leader plays in utilizing the table of organization and job descriptions. The value of good leadership, the qualities of a leader, and the study of techniques of leadership were invaluable contributions during this period. More recently have we reached what might be called the fourth phase. This has been contributed by the social scientists, or sociologists. The social scientist has pointed to the fact that the interrelation of the three previous contributions with the actual workers in the plant constitute a team. The worker must be considered a member of the team. In fact, the social scientist repeated what Elton Mayo had indicated—that we must not confine ourselves to the product but must consider the productive worker as well. Great amounts of time, effort, and money are expended to improve the product. A significant amount of interest, time, effort, and money must be given to improve the producer of the product so that we will not lose from our ranks, as Dr. Southard pointed out many years ago, two-thirds of our workers because they could not get along with their supervisors and fellow workers.[1]

The Whole Worker

Today we have begun to realize that a person cannot ignore either his concern with social, financial, and spiritual obligations or his very personal likes, dislikes, attitudes, and temperamental traits when he comes through the office door or factory gate.

Millions have jobs—millions work. Work is healthy. Human beings need to work—to give of themselves, to be productive, creative, to contribute to a total effort. Whether one can see the total process or only the finished product, the act of doing for a cause—a goal—gives meaning to living. The fact that we are compensated for our services all too frequently obscures the deeper significance. Surely we expect to be paid—to have money to procure the necessities and comforts of life; but work itself enriches our lives, particularly so if the job is satisfying, stimulating, and instills pride. Pride in one's job is not confined solely to the positions requiring technical skills.

There are, of course, many, many variables when one questions the suitability of a particular person to a job. I would hazard a guess that most of us came to our present jobs without major logical decisions involving careful evaluation of aptitude, temperament, and the other factors involved. Actually, personal needs which may not reach full awareness tend to make one more comfortable in one type of work than another. We look for such jobs. Recognizing this in recent years, psychologists have developed a variety of aptitude tests hoping to leave less to chance and intuition and more to careful analysis.

Let me emphasize that, while one may illustrate specific problems by situations which are unusual and perhaps abnormal, this in no way means that we are concerned only with workers who are emotionally or mentally ill. Actually, our concern is for the better adaptation of the normal worker to his job situation.

The goal of occupational health or mental health in industry should be to promote and maintain the highest degree of physical, mental, and social well-being. This will bring health and happiness to people at work.

Personal Adjustment

It can correctly be stated that a worker can be a bit fearful, a bit forgetful, a bit suspicious, a bit compulsive, irritable, and angry and still be very much a normal person. When confronted by stress and strain in the form of worries, whether they be precipitated in the home or at work, there may be an exaggeration of these particular traits. In other words, he may become more fearful, more suspicious or lose his temper more easily. For many workers, these particular qualities may appear and disappear. For others, they may be a part of the personality make-up of the individual.

Besides the foregoing traits, all human be-

ings in maintaining what might be called psychic equilibrium, or staying on an even keel resort to mental mechanisms with which many of us are familiar. Some of these are *rationalization,* which simply means to "save face"; *projection,* to "blame others"; *identification,* to "copy others"; *overcompensation,* an example of which is a "sullen loser"; *sublimation,* shifting some need or urge to a more acceptable area, e.g., hostility drained off in competitive sports; *displacement,* a device noted when one "scolds subordinates" after a run-in with the boss; *isolation,* the use of a protective measure such as a "phobia"; and *conversion,* noted when a "headache develops" in the face of an unpleasant task.

These are very helpful and enable many, many persons to ride the punches and handle unexpected setbacks and the like. When a person begins to depend upon one such mechanism for all his conflicts and anxieties, however, he begins to lose flexibility. The very device which was an asset can become a serious liability and make increasingly difficult the adjustment of the worker to his family, friends, and co-workers. Again, these are normal mental mechanisms which can become distorted in emphasis and lead to difficulty in adjustment.

If the utilization of traits mentioned previously and the mental mechanisms just described fail to protect, in a sense, the integrity of the individual, then additional subconscious defense mechanisms come into play without any awareness on the part of the individual.

So frequently do we find individuals precipitated into a sea of turbulence and uncertainty by the development of conflicts which apparently cannot be resolved. The presence of a conflict, with oscillation to and from each possibility, creates anxiety as a product. Anxiety is what we call that very uncomfortable feeling that grows and finally engulfs us when we cannot reach a decision.

If we could reach a decision, the need for a defense mechanism would no longer exist because the anxiety would disappear.

In order to protect this individual from such a disturbing situation which is progressively impairing his relationship to everyone about him, however, the human organism may develop any one of several defense mechanisms which are known to all of us. The person may show chronic maladjustment, or he may develop a psychosomatic disorder or sufficient changes in his make-up to constitute personality disorders involving both patterns and traits. Under stress, he may instead begin showing neurotic symptoms involving conversion reaction, phobias, obsessions, etc. Or he may develop a psychosis. It is true—a psychosis is a defense mechanism attempting to protect the integrity of the organism from what seems to be overwhelming disaster, but actually the defense mechanism adopted may be far worse than the real difficulty.

I shall not go further into a description of the particular way in which these mechanisms operate; they are surely very important, however, in the over-all picture of mental health in industry—whether we are dealing with someone already employed or are interviewing an applicant for a job.

Psychiatric Services

Successful personnel management, recruiting techniques, and good working relationships in any plant are dependent upon some understanding of the foregoing. I hasten to add that it is not the responsibility of the unit supervisor or personnel officer or excutive to attempt to do psychotherapy. However, by virtue of his close relationship with the worker and his knowledge of not only the particular employee but what is expected of him in the job, very successful handling of many of such difficulties which do not involve any deep-seated problems may be made possible. I know most seminars and workshops in human relations and employee relations have stressed this point.

Generally speaking, when a mental health or psychiatric unit is established, the medical department seems to be the ideal place. It is considered a neutral zone in many management programs and permits a degree of confidentiality that could not be expected elsewhere. A medical department may consist of only a nurse and a doctor on call or a part-time physician. With increasing needs, one finds a full-time physician specializing in industrial medicine with a psychiatrist in consultation. In larger operations, there may be a full-time psychiatrist who specializes in industrial psychiatry. Today, with the fuller acceptance of the vital needs in this area, we find not only a psychiatrist and a psychologist employed, but human relations experts, business administration and management consultants, personnel officers, plant physicians, industrial nurses, and social workers with industrial social work experience.

It is my understanding that industry for general health purposes of its employees employs 5,000 full-time physicians, with another 10,000 on a part-time basis and another 10,000 on emergency call.[13]

The mental health program in an industrial plant can be conceived of as an operation tying together the general health programs and the

human relations techniques and procedures practiced by all supervisory personnel.

There is a rather definite agreement on the scope of the services rendered by a psychiatrist.[6, 7, 8, 12] These include, (1) dealing with major psychiatric disturbances of workers in terms of diagnosis and disposition in the community; (2) dealing with minor psychiatric disorders of workers in terms of diagnosis and superficial or brief therapy; (3) advising on selection and placement of new workers who have psychiatric disorders or problems; (4) advising and assisting in the rehabilitation and placement of employees who are or who have been psychiatrically ill; (5) teaching and training medical department personnel concerning psychiatric and mental health aspects of industrial medicine; (6) taking part in mental health education programs for employees.

Comment

It is not unusual, however, when a large organization finds it of value to add to the medical department an industrial psychiatrist that as long as two years may elapse before that highly qualified person is fully accepted as a resource and utilized by management whenever the occasion arises.

In order, then, for the organization to develop to the highest degree its product, constant and continuing concern must be given to the productivity of the worker. Industry, then, must accept responsibilities to maintain a working climate which is conducive to good mental health.

In psychiatric practice, whether it be in private practice or in a clinic situation, the troubled person is usually aware of his unhappy relationship with other people. A situation has developed in spite of what he has tried to do and over which he is able to exercise less and less control. This frustrating situation involving those about him is confined not only to his own family and relatives but also to the neighborhood, his friends, and, perhaps most important for this subject today, his fellow workers and supervisors in the plant in which he works.

Problems are a mixture of environmental stresses and personal needs. Very frequently they appear in one or more large categories such as sickness, financial difficulties, marital adjustment problems, and concern over the children. Actually, these simply may be the overt manifestations of efforts on the part of the individual to handle not only the mental mechanisms for equilibrium, but the defense mechanisms of more serious maladjustments.

What, then, can be described as symptoms of poor mental health in industry? These symptoms, which collectively are estimated to cost from three to twelve billion dollars annually, are absenteeism, excessive turn-over, alcoholism, industrial accidents, lowered productivity, and labor strikes.

The insecurity, anxiety, restlessness, irritation, and sensitivity of the unhappy, dissatisfied worker produces, in effect, an emotional contagion which frequently cannot be resisted by a good number who are susceptible, and the state of tension begins to spread. Thus, it is most urgent that these individuals be given every opportunity to obtain psychiatric help.

Some of the more frequent factors that seem to undermine morale and, in turn, mental health are poor or bad supervision, work which is repetitious and has a high component of monotony, the lack of job security, and temperamental incompatibility of the worker and his job.

The full support of management should exist in the endeavor to support this employee in his hour of need. Each worker represents a sizable investment in time, effort, and money as witnessed by the amount of training that has been provided. Salvaging one employee into a more productive worker is not only an extremely satisfying service to a human being, but, more than that, it does and will accrue to better mental health for all of his co-workers.

Conclusion

In closing, let me point out that the mounting interest in vocational rehabilitation as it relates to the emotionally and mentally ill has drawn the psychiatrist much closer to the specialty of industrial psychiatry. The restoration of a man to his job and rebuilding his security and self-esteem serve to preserve our family life, stabilize our communities, and lessen the probability of the need of future psychiatric care. The productive worker is a taxpayer. Mental health programs in industry are good business.

Summary

Over the past 40 years, industry has shown increasing interest in the emotional problems of the worker. Pioneered by the significant contributions of Elton Mayo and his associates, this area of personnel relations has come to be the key to success or failure in industrial progress.

The objective of mental health activities in industry is to promote health and happiness of people at work. The most important way to seek this goal is not the provision of psychiatric services, but the planning of work tasks

and patterns of individual organization which do not run counter to human emotional needs.

By these definitions, a number of professions become involved in industrial mental health. The psychologist and the psychiatrist earn a place through their specialized knowledge of human behavior. The expert in human relations, business administration, and management is also a key person. The personnel officer, the plant physician, the industrial nurse and social worker, management and labor all deal with the human problems and health of the individual worker.

The restoration of a man to his job and rebuilding his security and self-esteem serve to preserve our family life, stabilize our communities, and lessen the probability of the need of future psychiatric care. The productive worker is a taxpayer. Mental health programs in industry are good business.

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Respiratory Disease Associated with Beryllium Refining and Alloy Fabrication

A CASE STUDY

Franz N. Metzner, M.D., and Jan Lieben, M.D., Harrisburg, Pa.

LARGE-SCALE beryllium refining and alloy fabrication are limited to a small number of industrial facilities throughout the world, whereas the use of beryllium and its alloys has spread increasingly into many branches of industry. Soon after industrial production of beryllium and its compounds was started in the late 1920's in Europe, occupational disease of beryllium plant workers, in the form of respiratory tract irritation and dermatitis, was observed and reported (Germany 1928, Russia 1936). Initially, this new occupational disease was attributed to fluorine and its compounds used in the course of the beryllium refining process and not to beryllium itself. This erroneous assumption was disproved in 1941 in Germany when the same occupational disease was observed in beryllium plant workers who had been exposed to beryllium only, and not to fluorine or its compounds. The same observation was made in the United States, where similar disease appeared in workers who were handling beryllium-containing phosphors in the fluorescent lamp industry.

Today, both the chronic form of beryllium disease—also known as beryllium poisoning, berylliosis, or pulmonary granulomatosis—and the acute pneumonitis are accepted as occupational diseases. Chronic beryllium disease may involve tissues other than the respiratory tract, such as the liver, spleen, kidney, lymph node, and muscle.

Criteria which are desirable but not always obtainable for the diagnosis of pulmonary beryllium disease include: evidence of exposure to beryllium, the roentgenographic pattern of beryllium disease on chest films, typical pathohistological changes of the lung tissue, and the analytical demonstration of beryllium in biopsy or postmortem lung specimens.

In the United States, acute and chronic respiratory tract disease and dermatitis among workers engaged in beryllium refining and alloy fabrication were first observed during the early 1940's in two large industrial facilities, one located in Ohio and the other in Pennsylvania.

Ohio Studies

Epidemiological, industrial hygiene, and air pollution studies carried out in and around the Ohio beryllium plant resulted in the conclusion that the above-mentioned respiratory disease was of occupational origin and was caused by inhalation of beryllium and its compounds. Approximately 300 cases of beryllium intoxication involving the respiratory tract were observed and treated over a 12-year period. Biopsy and postmortem findings had been interpreted initially as "pneumonitis and granulomatosis peculiar to beryllium workers."[1]

The disease was not limited to beryllium plant workers but was also discovered in housewives who had cleaned their husbands' beryllium-contaminated work clothes. There were also residents in the neighborhood of the beryllium plant with the same disease. No direct contact with beryllium could be established for them except through inhalation of the general atmosphere which was contaminated with beryllium from the plant operations. These findings were reported in a series of papers.[2–6]

Development of additional cases of beryllium disease among plant employees and neighborhood residents was reported to have been prevented by reducing in-plant and plant-neighbor-

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When the work was done upon which this report is based, Dr. Metzner was with the Division of Occupational Health, Pennsylvania Department of Health. Dr. Lieben is Director of the Division of Occupational Health, Pennsylvania Department of Health.

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hood atmospheric concentrations of beryllium to a point below the presently accepted threshold levels. In the United States these maximum allowable concentrations are 2.0 μg of beryllium per cubic meter of air for occupational exposure and 0.01 μg of beryllium per cubic meter of air for nonoccupational exposure.

First Pennsylvania Study

Acute and chronic respiratory tract occupational disease observed among employees of the other large beryllium refining and alloy fabrication plant, located in Pennsylvania, was studied by a different group of investigators during the 1940's. Their investigations resulted in the opinion that the above-mentioned respiratory tract occupational disease was caused by overexposure to fluorine and its compounds and could not be related to the beryllium exposure. These findings were published in several papers.[7-9]

These observations, however, were soon challenged by other investigators.[10, 11] Subsequent clinical and roentgenographic studies of beryllium plant employees and neighborhood residents with acute and chronic respiratory tract disease, when supported by biopsy and postmortem examinations and lung tissue analysis for beryllium, revealed that the disease observed at this beryllium plant did not differ from the similar disease reported as beryllium poisoning observed at other plants using or refining beryllium.

Present Pennsylvania Study

In 1957, the Pennsylvania Department of Health, supported by a research grant from the U. S. Public Health Service, initiated extensive medical-epidemiological and air pollution studies in the area of the Pennsylvania beryllium plant. The objectives were to obtain information as to the extent and cause of occupational and nonoccupational pulmonary beryllium disease in the area under study and to develop medical and engineering control measures which would prevent occurrence of beryllium disease in the future.

Early Findings—The medical epidemiological and air pollution studies in the area of the beryllium refining and alloy fabrication plant were started early in 1958. Initial findings from both studies, including the laboratory analytical procedures used, were reported in detail[12-14] early in 1959 but will be summarized for this presentation.

Information on a total of 58 cases of chronic respiratory tract beryllium disease had been collected when the above-mentioned reports were written. The patients with beryllium disease were divided into three groups: beryllium plant employees, 18; relatives of those employees who had contact with beryllium-contaminated work clothes, 19; and persons who lived in the neighborhood of the beryllium plant (neighborhood cases), 21.

Table I—Summary Information on all Chronic Pulmonary Beryllium Disease Cases From the Area of the Pennsylvania Plant, 1958

	Plant Employees	Clothing Contact Cases	Neighborhood Cases	Grand Total
Total number	20	22	26	68
Male	16	1	7	24
Female	4	21	19	44
Years of exposure before onset	0-15	1-13	6-19	
Latent period (in number of years)	0-12	0-14	....	
Number of lung biopsies and autopsies	9	13	16	38
Number with beryllium analysis of tissue	7	9	7	23
Positive for beryllium	6	8	7	21
Negative for beryllium	1	1	0	2

Neighborhood Air Samples—In order to determine atmospheric concentrations of beryllium in the area of the beryllium plant, a continuous air sampling program was maintained for a 14-month period. Twenty high-volume air samplers were located at various distances and directions from the beryllium plant. These samplers were operated in 48-hour cycles. They filtered approximately 4,000 cubic meters of air through a fine 8 × 10 inch glass fiber filter web (Mine Safety Appliances CT-75428) during each run. Over a four-month period in 1958, about 500 air samples were collected in the area of the plant and analyzed in the laboratory of the Division of Occupational Health in Harrisburg. The spectrographic beryllium determination and statistical evaluation of the samples revealed a mean concentration of 0.0155 μg of beryllium per cubic meter of air and a median concentration of 0.0040 μg of beryllium per cubic meter of air. Of the air samples, 10% showed beryllium concentrations exceeding 0.03 μg. Simultaneous background sampling in other areas of the state, where large steel mills and coal burning facilities were located, revealed the very low value of 0.0002 μg of beryllium per cubic meter of air for the median and mean concentrations. A two-week vacation shutdown of the beryllium plant during the sampling period resulted in the much lower value of 0.0015 μg of beryllium per cubic meter of air for the mean concentration, and confirmed the beryl-

lium plant as the main source of the beryllium air contamination in that area. Only total beryllium concentrations were recorded by spectrographic analysis. No attempt was made to identify any beryllium compounds.

Since the reporting of the above data, more information has been collected. Ten patients with chronic pulmonary beryllium disease were added to the earlier mentioned three categories: beryllium plant employees, 2; contact with beryllium-contaminated clothing, 3; and neighborhood exposure, 5. Table I provides summarized information on the three groups. In all of the reported 68 cases of chronic pulmonary disease, the causative agent is strongly believed to be beryllium.*

In the advanced cases of chronic pulmonary beryllium disease, the development of pulmonary hypertension with resultant cor pulmonale is the major complication. In only 1 of the 68 cases there was kidney disease in the form of recurrent bilateral kidney stones. In two cases, liver biopsy revealed hepatic involvement in the form of fibrotic and granulomatous changes.

In three instances, chronic pulmonary beryllium disease was observed in two members of the same family as follows:

1. Mother and son—son was employed at the beryllium plant for one year, mother had cleaned beryllium-contaminated work clothes of husband and son.
2. Sister and brother—mother had cleaned beryllium-contaminated work clothes of her husband for about four years, often in the presence of her children.
3. Mother and daughter—both had cleaned beryllium-contaminated work clothes of husband and father.

Cancer and Sarcoid—Careful screening of hospital records revealed three cases of carcinoma of the lung in employees of the beryllium plant after 10 to 15 years of beryllium exposure. The pathologist reported no evidence of chronic pulmonary disease in these men. Six cases of Boeck's sarcoid were discovered which had been diagnosed during the six years prior to this study. One of the patients with sarcoid was a female employee of the beryllium plant. Approximately 100,000 persons live within a seven-mile radius of the Pennsylvania beryllium plant. This incidence of sarcoid closely follows that reported by others.[16]

Acute Cases—Satisfactory information on beryllium plant employees who had developed acute respiratory tract disease in the form of acute chemical pneumonitis or acute chemical tracheobronchitis as a result of exposure to beryllium and its compounds during the past 20 years was rather difficult to obtain. According to incomplete reports from different groups of investigators, approximately 280 cases of so-called acute chemical pneumonitis and acute tracheobronchitis had been so diagnosed.

A check of these cases against the participants in the 1958 periodic roentgenographic chest examination of beryllium plant employees, revealed that 14 employees were still working in the plant. Twelve of these had normal chest roentgenograms, and two showed pathologic changes suggestive of chronic beryllium disease.

No large-scale attempt was made to obtain follow-up information on the remaining persons, since they had accepted other employment and, in many instances, had left the community. Recent follow-up chest roentgenograms of 12 persons who had acute chemical pneumonitis 3 to 13 years prior to this investigation and had discontinued employment with the beryllium plant showed no abnormal chest findings and no symptoms suggestive of beryllium disease.

In most instances, acute chemical pneumonitis with typical roentgenographic chest findings in beryllium plant employees caused disability lasting from four to six weeks. After recovery, employment at the beryllium plant was discontinued, in most instances upon recommendation by the plant physician. During the three years 1957 to 1959 there were 12 cases of acute chemical pneumonitis or tracheobronchitis reported by the plant. Only two or three persons have residual pulmonary abnormalities today.

Discussion

The findings of this recent epidemiological and air pollution survey in the area of the Pennsylvania beryllium plant reveal conditions as they existed only during the period of the study. This information becomes more meaningful, however, when compared with survey

* In all cases there are documented evidence of exposure to beryllium, roentgenographic evidence of chronic pulmonary beryllium disease, and typical symptoms (cough, shortness of breath, weight loss) and clinical findings. In addition, postmortem or biopsy lung specimens obtained in 38 cases show histopathological evidence of chronic beryllium disease, and in 21 of 23 different lung specimens the laboratory spectrographic analysis revealed beryllium in varying concentrations.

Information on these cases of beryllium disease has been transmitted to the Central Beryllium Case Registry for the U.S.A., at the Massachusetts General Hospital in Boston, Mass., where information on more than 600 cases of beryllium disease has been collected.

Table II—Beryllium Found in Lungs as Compared with Length of Exposure

Employee	Length of Exposure, Years	Micrograms of Beryllium per 100 gm Lung Tissue
1	1	41.0
2	7	358.0
3	12	236.0
4	15	1,842.0

data collected over the past 20 years from the plant area.

Incidence by Exposure Category—Of interest is the incidence of chronic pulmonary beryllium disease in the three different case categories when compared with the number of persons in each group who were exposed to beryllium over the past 20 years.

Approximately 4,000 different persons were employed at the beryllium plant; 2,000 housewives cleaned their husband's beryllium-contaminated work clothes; and 100,000 persons live within a seven-mile radius of the beryllium plant.

The incidence is greatest in the group of housewives who cleaned beryllium-contaminated clothes. In the course of the Ohio study, it was shown that home laundering of beryllium contaminated work clothes accounted for the inhalation of up to 17 μg of beryllium per day.[4]

Most persons in this group have lived or now live in the neighborhood of the beryllium plant, and thus had additional exposure to beryllium-contaminated air for many years.

According to survey findings[8, 9] published in 1949 and 1954, concentrations of beryllium in many sections of the plant exceeded the presently accepted maximum limit of 2.0 μg of beryllium per cubic meter of air by a factor of 10 or even 100.

The high exposure of beryllium inside the plant is further documented by a study of urinary excretion of beryllium carried out on 22 plant workers over 24-hour week-end periods in 1953. Concentrations ranging from 0.080 to 5.430 μg of beryllium per liter of urine were found, with 35% of the samples containing more than 2.220 μg per liter. Analytical studies on postmortem lung tissue samples of former beryllium plant employees with no signs of pulmonary beryllium disease revealed rather high beryllium concentrations, which increased with the length of exposure (Table II).

Earlier information on beryllium concentrations in the close neighborhood of the beryllium plant is limited to short sampling periods. Concentrations ranged from 1.0 to 1.8 μg in 1953, and from 0.94 to 1.4 μg of beryllium per cubic meter of air in 1954.

Beryllium in Lung Tissue—The neighborhood beryllium air pollution is reflected in the beryllium content of lung tissue of the general population in the neighborhood of the beryllium plant. Lung tissue samples were collected in 13 consecutive hospital autopsies and were analyzed for beryllium content. The results show that every lung tissue sample from the population in the beryllium plant area contained beryllium in varying amounts.

For comparison, 12 lung tissue samples from areas 50 miles or more from the beryllium plant were analyzed. These samples contained beryllium in only about 40% of the samples and in lower average concentrations than those from the beryllium plant area. Laboratory processing and analysis of a large number of lung tissue samples revealed that samples in the weight range from 50 to 100 gm show more accurate and often higher beryllium concentrations than small biopsy samples consisting of peripheral lung tissue with a weight range up to 20 gm.

Susceptibility—An analysis of all cases of chronic beryllium disease from the above study reveals a much higher percentage of females (65%) than males (35%), although only a very small number of females were employed in the beryllium plant. Among the group females were affected more frequently by beryllium, a fact which was not observed by other investigators.[15]

Of special interest are the three reported instances where two members of one family developed chronic pulmonary beryllium disease. It seems to point out that, in certain persons, there may be an increased susceptibility or some unknown factor present, favoring the development of beryllium disease.

Control Measures—It is important to state that the beryllium plant has taken the steps necessary to prevent further development of beryllium disease both inside and outside the plant.

Exposure to beryllium-contaminated work clothes in the homes of plant employees was eliminated several years ago by prohibiting removal of such work clothes from the plant premises.

Installation of well designed air cleaning equipment reduced in plant and neighborhood beryllium contamination to safe levels.

As a result of these precautions, it is expected that few new cases of beryllium disease will develop.

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Case Report

Exfoliative Dermatitis from Exposure to Paint Thinner

M. H. Samitz, M.D., Philadelphia, Pa.

THE CASE reported herewith demonstrated several interesting points concerning exposure factors responsible for a generalized exfoliative dermatitis and erythroderma, the problem of differential diagnosis, and the untoward reaction resulting from patch testing.

The patient, a 50-year-old man whose occupation was assembling heater parts, was first seen on Aug. 16, 1958. He gave a history of having had an eruption which began three months previously. During this three-month period he had received various topical and parenteral medications, including penicillin, and several x-ray treatments. The skin condition was of such severity as to necessitate hospitalization in June for 7 days and during July for 19 days. The patient was studied as a case of lymphoblastoma (Hodgkins) on both admissions.

The patient had been in good health up to his present illness. The dermatitis appeared first on the penis, then proceeded to cover the arms and legs. It originally began as "bumps" and then became papular with lesions of varying sizes. The condition progressively worsened until the entire body became involved.

Initial examination, on Aug. 6, 1958, showed a well-nourished white man with a generalized exfoliative dermatitis and erythroderma. Axillary and inguinal lymphadenopathy was distinct. Spleen and liver were not palpable on examination.

The following diagnoses were considered: (1) lymphoblastoma (Hodgkin's ?); (2) drug sensitization (possibly penicillin); (3) epidermal sensitization (contactant undefined).

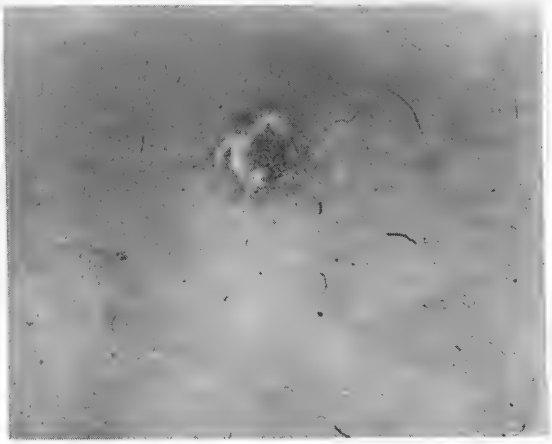
The patient was hospitalized from Aug. 17 to 31. The possibility of a lymphoblastoma was eliminated by skin biopsy, gland biopsy, and bone marrow examination. Bone marrow sections revealed a normal architecture with moderate hyperplasia and a moderate eosinophilia. No abnormal cells were seen. There was no evidence of leukemia or lymphoblastoma. The patient showed distinct improvement under a regimen of colloidal and hydration baths.

In view of the unpredictable nature of such generalized exfoliative pictures, the patient was advised to take things easy at home. Throughout September and October there was progressive improvement. During the first week of November, there was a slight flare-up; the only clue we could detect was the use of a flower spray or the fresh paint of his neighbor's home. He returned to work in the second week of November and within 24 to 48 hours experienced another flare-up, especially in the intertriginous areas. From the description of his work, this patient handled small brass parts without contacting any chemicals, but to reach his work table he had to pass through a recently painted room. Other sections at the plant had the usual volatile chemicals common to the industry.

In order to eliminate possible home environmental sensitizers, my resident visited the patient's home and stayed with him for a day. No home or environmental clues were detected. The patient stayed at home and improved. Exacerbations recurred twice during December when the patient returned to his job, with remission when he stayed at home. Since January, 1959, the patient has returned to work on four occasions. Each instance resulted in a severe flare-up within 24 to 48 hours. All symptoms were ameliorated when the patient was away from his job.

Inspection of the plant revealed that the patient's locker room was adjacent to a room where solvent solutions, paint thinners, and removers were stored. The lockers were of the open-wire type. Solvent vapors were evident in the locker room.

By Feb. 2, 1959, the patient's condition had improved considerably, enough to permit patch test-



Patch test reaction after 24-hour exposure to paint remover/thinner.

*Presented at the Dermatology Symposium, Industrial Medical Conferences, Rochester, N. Y., April 26, 1960.

ing. A modified patch test for volatile chemicals was used. In this technique, a piece of gauze is moistened with the solution and is placed in a small perforated top of an ointment tin. The tin is fixed by adhesive tape into the top of a larger-sized tin, to prevent any direct contact of the solution with the skin and allow volatilization of the solvent. The following solvents used in the plant were diluted 1:4 with corn-oil: thinner (formula undetermined); degreaser (formula undetermined); black paint with thinner; white paint with thinner; cleaning alcohol; and paint remover/thinner.

The patch tests were applied at 10:30 a.m. Within one hour the patient returned to the office because of discomfort. The patch tests were removed at 11:45 a.m.

The following reactions were noted:

	1½ hr	24 hr
Thinner	–	+
Degreaser	–	–
Black paint with thinner	–	+
White paint with thinner	–	+
Cleaning alcohol	–	+
Paint remover/thinner	+++	+++++

After 24 hours, the site of the patch test with paint thinner showed a distinct ulceration with marked surrounding inflammation. The entire skin was erythematous. After 48 hours, the patient's face was edematous and a generalized erythroderma and exfoliative dermititis were evident. The severity of the reaction necessitated rehospitalization. After three weeks under a conservative regimen, the patient improved sufficiently to return to his home.

No attempt was made to establish the offending component of the thinner solution; the patient was advised to avoid any future contact with chemicals in the paint thinner group. Fortunately, he was a man of many talents and a change in occupation, to that of a self-employed bookkeeper, solved the exposure problem.

Summary and Conclusions

This case demonstrates several interesting points: (1) conditions of exposure in a manufacturing plant wherein volatile solvents were responsible for a severe incapacitating skin condition; (2) the clinical features of the skin condition, simulating the picture of a lymphoblastoma; (3) the use of the patch test to demonstrate the causal agent and the severe consequences that followed patch testing; (4) the importance of eliminating nonoccupational factors as causal agents and the evaluation of home exposures as trigger factors responsible for flare-ups.

(The author's address is 1715 Pine St., Philadelphia 3, Pa.)

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Book Reviews

FIRST AID, DIAGNOSIS AND MANAGEMENT. Warren H. Cole, M.D., and Charles B. Puestow, M.D. Price, $6.25. Pp. 420, with illustrations. Appleton-Century- Crofts, Inc., 35 W. 32nd St., New York 1, N. Y., 1960.

By RICHARD A. SUTTER, M.D.

"First Aid, Diagnosis and Management" is a newly revised 420 page fifth edition of a popular work written by Warren H. Cole, Professor and Head of the Department of Surgery, University of Illinois College of Medicine, and Surgeon-in-Chief, Research and Educational Hospitals, Chicago; and Charles B. Puestow, Clinical Professor of Surgery, University of Illinois College of Medicine and Graduate Schools, with special chapters written by an impressive list of 16 authors. First published in 1942 to fill the need for a text containing basic information about first-aid measures for civilian rather than industrial or military casualties, it is designed to meet the need of those charged with administering first aid, which Dr. Cole defines as "the assistance rendered before definitive treatment can be carried out." At this time the authors anticipated the possibility of civilian casualties outnumbering war casualties. It later became apparent that a text covering civilian type emergencies would be equally useful in industry because of the large number of similar emergencies likely to appear on the industrial scene.

The first six chapters, written by Dr. Cole and Dr. Puestow, cover precautions and limitations in first aid work; general principles of first aid, common conditions requiring first aid, materials needed; anatomy and physiology; bandaging; wounds; shock, blood transfusions. Of these, Dr. Cole's "Precautions and Limitations in First Aid Work" and "General Principles of First Aid" are classics that alone would warrant reading and owning this volume. The remaining chapters, well written and well illustrated, are intended primarily for the lay student and prepare him for understanding of the chapters which follow. These chapters by 16 outstanding contributors more than adequately cover their subject headings: injuries to the large blood vessels; respiratory emergencies; burns; frostbite; fractures; dislocations and sprains; emergencies of the genitourinary tract; first aid in industry; open fractures, open dislocations; missiles, rockets, nuclear bombs, and other forms of attack; injuries to the chest; medical emergencies; injuries to the scalp, skull, spine, and nervous system; injuries to the hand; wounds of the mouth, face, and neck; transportation of the injured.

These chapters are well organized to cover all the organs, structures, and systems of the body. New to this edition is the chapter on missiles, rockets, nuclear bombs, and other forms of attack which contains much useful information for those formulating plans for care of mass casualties in plants in the event of war. Author of this section is Harold C. Lueth, Clinical Professor of Medicine, University of Illinois College of Medicine, Chairman, Disaster Medical Care Committee, American Medical Association, and Brigadier General, U.S.A.R.

Also added is "First Aid in Industry," by Burton C. Kilbourne, Clinical Associate Professor of Surgery, University of Illinois College of Medicine, and Eudell G. Paul, Clinical Assistant in Surgery, University of Illinois College of Medicine. Physicians actively engaged in industrial or occupational medicine may take exception to the statement made by Drs. Kilbourne and Paul that "aspirin and a few hypo tablets of morphine are probably the two absolutely indispensable drugs for a first aid station," as many practitioners believe that morphine, especially in tablet form, is not only unnecessary in first aid stations, but that the many dangers posed by having this narcotic on hand far outweigh its occasional usefulness. Generally speaking this chapter approaches problems from the out-of-plant or even academic standpoint, and for this reason is of less value to the in-plant physician or nurse.

All in all, Drs. Cole and Puestow provide an excellent text, which, although not written primarily for the industrial or occupational physician or industrial nurse, is certainly of value as a review and a reference source for teaching first aid to laymen. Basic principles of diagnosis and management of first aid are presented brilliantly, and this reviewer heartily recommends this book for inclusion in the libraries of all those interested in improving the quality of "the assistance rendered before definitive treatment can be carried out," regardless of the scene of the emergency.

Dr. Sutter is head of the Sutter Clinic in St. Louis, Mo. He is also a Director of the Industrial Medical Association.

TRAUMA AND DISEASE. Alan R. Moritz, M.D., and David S. Helberg, J.D. Price, $17.50. Pp. 903, with illustrations. Central Book Company, 850 De Kalb Ave., Brooklyn 21, N. Y., 1959.

By PAUL K. WALTZ, M.D.

The editors of this republication of the works of others have gathered an excellent and thought-provoking collection of papers concerning trauma and disease. Chapters on causation, cancer, radiation, trauma, and disease, including the spine, nervous system, joints and arthritis, the digestive tract, and miscellaneous organic illnesses, are applicable directly to most of the daily problems which face an industrial physician.

Each chapter has more than one author and is headed by editorial comment which is most useful

Dr. Waltz is a practicing surgeon in Harrisburg, Pa., and surgeon to the Bethlehem Steel Company plant at Steelton, Pa.

in trying to evaluate work situations as they apply to industrial trauma and disease.

Viewpoints of the doctor's cause and the lawyer's cause in the medicolegal conflicts make the reader immediately aware that there is much need for common understanding in terms, diagnosis, concepts, and conclusions. The subject material and presentation are both useful and interesting.

Useful references have been included at the end of many of the papers so that further investigation of any particular problem is facilitated. The majority of the articles represent advances in the field of legal medicine and will almost surely help improve the quality of justice in the evaluation of personal injury cases. The detailed coverage of many of the controversial subjects that are the real problems in industrial medicine and surgery make this book a highly recommended volume.

BACK PAIN, DIAGNOSIS AND TREATMENT USING MANIPULATIVE TECHNIQUES. John McM. Mennell, M.D. Price, $9.50. Pp. 226, with illustrations. Little, Brown & Company, 34 Beacon St. Boston 6, Mass., 1960.

By M. LAURENS ROWE, M.D.

In yet another attack upon the ubiquitous low back problem, the author, whose chief interest and experience lies in the realm of physical medicine, attempts to describe his methods of diagnosis and treatment using manipulative techniques.

He admits in his preamble that "manipulation is an art which is difficult to learn from the written word and the printed illustration." This reviewer, after thorough reading and rereading of his book, could not agree with him more heartily.

Mennell feels that a pathomechanical entity, which he terms joint dysfunction, is the outstanding cause of common back complaints. Joint dysfunction most commonly results from trauma, disuse, postural defects, preexisting disease, and as a result of congenital anomalies. It is also associated with bone and joint disease.

Following trauma, dysfunction is frequently associated with a hypothetical condition called "joint lock." This is defined as either an unreduced sublinical subluxation of the joint or a "seizing up of its articular surfaces on one another."

The author seeks to explain how these conditions may be diagnosed and treated when they occur in any of the joints of the spine. He examines for these conditions in 12 interlaminar synovial joints and 2 sacroiliac synovial joints in the low back, 48 synovial joints in the thoracic region, and 14 joints in the neck. Having detected the condition in any one or more of these 76 deep-lying joints, he attempts to describe how he sets things aright by a manipulation which, in most instances, is the same maneuver used to make the diagnosis in the first place.

Dr. Rowe is in the practice of orthopedic surgery in Rochester, N.Y. He is Chairman of the Medical Board, Rochester General Hospital, and consultant in orthopedic surgery, Eastman Kodak Company.

In the opinion of this reviewer, the best summary of the whole matter appears on page 110 of the book. In the words of the author: "Perhaps the greatest difficulty in explaining the subject of manipulation in writing is that manipulative therapy is an art. The techniques of an art can only be taught with any certainty by practical demonstration. It is my experience that it takes six months for a well-trained physician in preceptorship training on patients and practicing on the normal subject after hours to master the science of diagnosis and the art of therapy, using manipulative methods. Thus, to learn this subject is a formidable undertaking for an active medical practitioner. But if it is worth doing, it is worth doing well. Anything but the use of correct technique places the patient in jeopardy and the reputation of the method will suffer rather than the reputation of the practitioner or the method."

Publications Available

The following list of publications has been compiled on the basis of probable interest to the readers of this Journal and is presented solely for the purpose of giving notice of their availability.

The Head: A Law-Medicine Problem. Oliver Schroeder Jr., and Samuel R. Gerber. Price: not given. Pp. 431. Multi-Stat Copy Company, 1517 Superior Ave., Cleveland 14, Ohio, 1957.

The book reports the lectures and discussions presented at the Institute on the Head, one of a series of interprofessional explorations at the Law-Medicine Center, Western Reserve University, Cleveland, Ohio. There is a glossary of medical terms for use by nonmedical persons and an index.

Hypothermia and the Effects of Cold, Brit. M. Bull. 17: 1-78 (Jan.) 1961. Obtainable from the British Council, 65 Davies St., London, W.1. Price, 3.25.

This issue of the *British Medical Bulletin* is devoted to a series of papers regarding the problems associated with hypothermia in man and animals. Information is presented on the effects of hypothermia on metabolism, endocrine function, central nervous system, and circulatory system. There is also some presentation regarding the biochemical changes associated with acclimation to cold and the phenomenon of hibernation. The presentations are quite authoritative, coming from 16 British workers actively engaged in the study of hypothermia.

API Toxicological Reviews. Ed. 2. Price, 25 cents. American Petroleum Institute, 1271 Avenue of the Americas, New York 20, N. Y., 1960.

The medical advisory committee of the American Petroleum Institute has released revised toxicological reviews covering chemical compounds of interest to the petroleum industry. These reviews have been brought up to date and, in general, cover the properties and characteristics of the chemicals; manufacturers; uses and sources of exposure; toxicology,

including acute and chronic effects of the chemical; and precautionary measures recommended. In each case a bibliography is presented to substantiate the comments included in the review. The second edition of the reviews, which now include copper naphthenate, naphthalene, naphthenic acids, butadiene, benzene, toluene, and xylene, was prepared at the Harvard School of Public Health, Boston, Mass., under the direction of Prof. Philip Drinker.

Questions

The questions published in this column are edited versions of requests for information that have been received during recent months. The answers have been prepared by one or more competent authorities in the particular area covered by the question. Readers may address questions to the Editor.

QUESTION: *Are there any tests which could be applied in the field to evaluate the effects of exposure to organic phosphates on workers or using such compounds?*

ANSWER: At present the best field test for screening workers exposed to organic phosphate compounds is the tests which employ bromthymol blue method for the evaluation of acetylcholinesterase. This is not a substitution for more accurate tests of acetylcholinesterase activity, such as the Michel test, but is of value where field conditions do not permit more exacting tests to be accomplished. The error in such tests is estimated to be plus or minus 25%. Its cost is less than 50c per test. All individuals who have abnormal values with such screening tests should not be permitted to have further exposure to phosphate ester insecticides until a more accurate laboratory test has been performed.

QUESTION: *Because of the rapid growth of rehabilitation philosophy and the establishment of rehabilitation centers, what are the indications for referring serious injuries, including amputations of both upper and lower extremities, to such centers?*

ANSWER: At present, the indications for referring patients with serious injuries to rehabilitation centers are assuming increasing importance. Many patients who have suffered serious injuries without requiring an amputation include those who have been immobilized in plaster casts for extended periods of time with limitation of motion not only of affected joints but of adjacent joints, which are of necessity also immobilized. Because of this, it is necessary that these patients receive a full days program of exercises to improve their range of motion, strength, and endurance as rapidly as possible. This is important not only for patients who have sustained multiple fractures, but equally important for those who have suffered injuries requiring long periods of bed rest. This is also applicable to those who have had extensive abdominal surgery as well.

Patients who have had amputations are better handled in rehabilitation centers. These institutions usually have excellent prosthetists working in conjunction with the medical and paramedical personnel. Through a team evaluation of the problem before a prosthesis is ordered, a more functional result can be achieved. Furthermore, after the prosthesis has been obtained, the patient is directed in its use by those trained in the proper use of such equipment and capable of recognizing deficiencies in the equipment. It is common practice at this time for many insurance carriers who recognize these facts to avail themselves of such skilled care and management for their handling of patients with amputation problems. They find that is more economical for many reasons and that through proper training the amputee is rendered more likely to use his prosthesis and to use it well.

Letters

TO THE EDITOR: With reference to Part IV of the series on "The Treatment of Industrial Hand Injuries" by Drs. Kilbourne and Paul (April, 1961, pp. 218-220), there are two points on which I wish to comment.

Although the trimming of the condyles is most desirable in order to form a more satisfactory stump when a digit is disarticulated, there is a complication. In computing specific loss, if the bone of the middle phalanx is disturbed, the award is for an entire finger, instead of one-half finger! This is entirely unreasonable, as are a lot of other features of the workmen's compensation, but being caught this way myself has made me very wary.

Since the claims departments of the insurance companies are taking over the practice of surgery, the doctor has an added pressure in addition to all the others. When one attempts to do the best job possible and then is blamed for causing payment of additional compensation—'nuf said. This is particularly annoying when a "claims man" says in effect, "This or that clinic did one for us last month and didn't do that and he has a good stump." So?!

The replacement of the pad of the tip of a finger by grafting is most desirable, but here again complications are present. In my experience the use of a free split-thickness graft has been unsatisfactory, and pedicle grafting from the abdomen has been 100% successful. Again factors other than strictly surgical are at work. Successful free grafting depends upon the graft area being undisturbed for several weeks. Even if the individual is off work one never knows what he is going to do.

In the second place, it is difficult to convince an employer and the claims department that loss of time is essential when that patient has only a "little cut on the tip of a finger," whereas if he has one arm bandaged to his chest for three weeks, the disability is obvious to everyone!

Congratulations to the authors on a fine series of articles. —E. P. MACKENZIE, M.D.

Editorial

Remedy for 'Tis and 'Taint

SERIOUS students of today's industrial medicine are in agreement that the remaining tough problems in our field can be successfully studied only by means of formal epidemiology. Straightforward, out-and-out occupational disability cases are rarely contested these days; such matters are usually amicably settled out of court. Contention now centers around claims of aggravation of some concurrent, chronic disability, or deals with alleged causation in a particular case, of some chronic disease by an agent to which the employee was exposed. The precipitation of coronary occlusion by physical exertion is now a legal fact if not a scientific one. The inhalation of irritant substances in the plant air, irrespective of concentrations involved or the duration of exposure, is in some jurisdictions sufficient to establish a claim of aggravation of chronic bronchitis and its associated obstructive emphysema. There is a general impression abroad that claims of this sort, already constituting some 50% of claims for occupational disability, are steadily on the increase. In our present lack of exact knowledge of degenerative disease etiology we've got to do something better than go to court to make fools of ourselves, arranged in teams of medical testifiers who will assert on one side, 'Tis so!, and on the other, with equal disproportion between available heat and light, 'Taint!

To be sure, the technics of epidemiology are of little value in pinning down an exact cause in a specific case of the kind of disease under consideration here; but an understanding of the broad characteristics of the disease in terms of its incidence and prevalence among groups of people, and an understanding of how the disease varies with time, geography, and host characteristics, should provide rational support for one or another point of view where now only intuitive belief exists.

The least complicated epidemiological exercise of industrial medicine is that which relates specific pathology to a single agent, in which animal experimentation has revealed the lesion produced by a chemical. The workers at risk in the production and use of the chemical are observed for development of the predicted change. This observation is correlated with measurements of the chemical in the environment. Intensity and duration of exposure are matched with severity of reaction in the exposed workers, dose-response relationships are identified, hygienic standards are established, and a satisfactory control program is got under way. Unfortunately, this set of circumstances comes about all too infrequently.

The exercise becomes more complicated when we have an understanding of one component of the problem and are required to discover and describe the second. Thus, long after the uniqueness of the silicotic process was suspected it took some doing to define the industrial exposure which would produce the change. The rough epidemiologic observations and reasoning of centuries ago served to match the clinical picture with some general classes of employment. Early in the 19th century Thackrah narrowed down the etiologic possibilities to dusts generated in dry industrial processes. A century later Collis, making brilliant use of formal epidemiology, identified silica as the causative agent. Soon thereafter it became possible to take the problem to the laboratory for a study of details that still goes on.

The challenge before us deals with the most complicated class of problems in which neither of the primary variables is understood. On the one hand is a list of chronic, degenerative diseases of unknown etiology, occurring with some unidentified frequency throughout society. On the other is a host of environmental stresses in the home, the place of work, and the community, which alone or in some combination may serve as cause or aggravation. The instinct of the sensible man is to avoid this welter; but, unhappily, there seems to be no choice in this regard. The alternative to endless bickerings of 'Tis and 'Taint is to begin at once, through the use of the tools of epidemiology, to look for some facts that lie hidden in the enormous industrial medical experience going on before us.

Abstracts of Current Literature

Surgery

Traumatic Injuries to Abdominal Organs. F. Glenn* and B. Thorbjornarson. Am. J. Surg. 101: 176 (Feb.) 1961. (*Dept. of Surgery, New York Hospital, Cornell Medical Center, New York, N. Y.)

The authors report 60 cases of trauma to the abdomen treated at the New York Hospital between 1932 and 1958; one-third of this series were caused by blunt trauma and two-thirds by penetrating trauma.

The necessity for abdominal exploration when penetration of the abdominal cavity has occurred is generally accepted. The decision for operation in cases of blunt trauma is more difficult. Constant close observation is necessary for early detection of signs and symptoms which demand exploration. Symptoms arise from blood loss or peritonitis.

A history of trauma to the left side of the chest or hypochondrium with signs of peritoneal irritation in the left subphrenic area or clinical signs of blood loss require immediate operation. Enlarged or diseased spleens are more liable to rupture, and with less severe trauma, than normal small ones. Suspicion of a splenic injury makes operation mandatory.

The dangers from injury to the liver are early hemorrhage, later derangement of function, infection, and bile peritonitis. Right upper quadrant signs which remain localized do not demand immediate surgery, but, if repeated close observation suggests exacerbation or onset of infection or bile peritonitis, exploration is indicated.

Penetrating or blunt injuries of the hollow viscera develop either a chemical or bacterial peritonitis, depending on the location. The status of the organs at the time of injury greatly influences the extent of damage to be expected. If full, they are more liable to rupture or perforation than when in the empty state. Wounds of the stomach, duodenum, and small bowel should always be closed primarily. Wounds of the colon with large areas of devitalized tissue or those of the sigmoid or left colon require exteriorization or proximal colostomy with drainage.

In reviewing their positive laboratory findings, the authors found radiography the most helpful in the decision for exploration. The authors emphasize, however, that the diagnosis and decision whether or not to explore in abdominal trauma has to be arrived at almost solely by clinical means. In the doubtful situation, continual and constant observation for any changes as they occur is obligatory. —R.J.T.

The Versatile Cross-Finger Pedicle Flap. H. D. Hoskins.* J. Bone & Joint Surg. 42-A:261 (March) 1960. (*Oakland, Calif.)

The usefulness and versatility of the cross-finger pedicle flap in the resurfacing of the volar, dorsal, and tip surfaces of the fingers or the thumb are stressed by the author. He emphasizes that the surgeon responsible for management of soft-tissue loss in the digits must have a knowledge of the advantages, and disadvantages of all methods available for the provision of suitable cover. The exclusive use of any one method cannot be advocated, since each serves a useful purpose under specific conditions.

The author presents 26 consecutive cases in which cross-finger pedicle flaps were used to provide soft-tissue covering in primary and secondary reconstruction of the fingers and thumb to reemphasize the usefulness of the procedures in appropriate situations. Excellent drawings and photographs illustrate the mechanism of this type of flap coverage. In the 28 cases presented, the final result was classified as good to excellent in 22, fair in 3, and poor in 1.

As a result of his experience with this method, the author is using it with increasing frequency when coverage of soft-tissue defects on the digits of the hand by pedicle flap seems desirable.

—J.T.A.

Clinical Toxicology

Carcinogens in the Human Environment. W. C. Hueper.* Arch. Path. 71:237 (March) 1961. (*National Cancer Institute, Bethesda, Md.)

This article, the first of two installments, is a discussion about and compilation of known and suspected carcinogens of naturally occurring and man made origins. Subject matter dealt with in the discussion includes the characteristics of environmental carcinogens, classifications according to chemical properties, target organs, carcinogenic potency, and carcinogenic completeness; action mechanism of carcinogens; and "safe dose." In the extensive compilation of the agents Hueper lists for each the sites of the cancers, exposure stigmata, compounds of economic importance, operations and products with contact to producers, processors, users, consumers, residents, population groups with occupational and environmental exposure, and non-occupational groups. Vast numbers of materials are included in the compilation. —L.H.M.

Methyl Bromide Poisoning. E. M. Rathus and P. J. Landy.* Brit. J. Indust. Med. 18:53 (Jan.) 1961. (*South Brisbane Hospital, Queensland, Australia.)

Seven cases of methyl bromide poisoning occurred among approximately 40 men engaged in the fumigation of houses. The cases occurred despite the fact that the workmen were instructed concerning the toxic properties of the material, the need to exercise care in carrying

out the operations, and the provision of army-type facepieces equipped with gas canisters that were stated to be effective against methyl bromide that had been inspected and tested by official agencies. Subsequent to the intoxications it was determined by tests that the canisters broke down within one minute and allowed 200-500 ppm to pass through and in concentrations sufficient to produce burning (erythema) of the portions of the faces covered by the masks.

Brief summaries of the case histories and bromide levels in the blood, cerebral spinal fluid, and urine specimens are presented. Symptoms and signs in the various cases included vomiting, shortness of breath, twitching of muscles, clonus, generalized convulsions, faulty balance, visual and auditory hallucinations, abnormalities of gait, nystagmus, dizziness, and tremors. Electroencephalographic abnormalities were demonstrated, and signs of pulmonary edema were present in two cases.

The mechanism of methyl bromide intoxication is discussed. It is believed that the methyl bromide attaches to protein molecules in a manner similar to that of the heavy metals, presumably to the sulfhydryl groups found in the enzyme systems. Because of this, dimercaprol (BAL) was administered in addition to barbiturates and measures to combat pulmonary edema were instituted. Neurologic symptoms occurred from two to four hours after exposure and affected the cortical, cerebellar, and basal ganglion structures.

—L.H.M.

Pulmonary Fibrosis in Workers Exposed to Finely Powdered Aluminum. J. Mitchell, G. B. Manning, M. Molyneux, and R. E. Lane.* Brit. J. Indust. Med. 18:10 (Jan.) 1961. (*Nuffield Department of Occupational Health, Manchester University, and The Royal Infirmary, Bolton)

Six cases (two fatal) of pulmonary fibrosis have been found among 27 workmen examined from a total of 30 at risk in the factory. Fine aluminum powder and a coarser powder were made for use in fireworks and aluminum paint respectively. Aluminum foil was stamped into a coarse powder which was treated with varying quantities of stearin to prevent agglomeration of particles. In 1952 mineral oil was substituted for stearin in the manufacture of the powder for use in fireworks.

Seventy percent of the particles of aluminum in air samples were 5μ or less in diameter, and all but a few particles were very irregular and flattened. Chemical analysis of the dust revealed the following composition: approximately 17% oxides and hydroxides of aluminum; 81.4% free aluminum; 0.5% stearin (50% palmitic and 50% stearic acid); 0.5% silicon; and approximately 0.1% copper, magnesium, manganese, and iron. Beryllium was not found. The mean respirable aluminum dust concentrations varied from 19 to 144 mg per cubic meter at the various operations.

Case histories, chest x-ray films, photomicrographs of lung sections, pulmonary function test results, exposure data, and industrial hygiene data are presented, as well as a concise review of the problem since the first case of fibrosis in an aluminum operation workman was described by Bader in Germany in 1934. The authors found no evidence to show that stearin was responsible for the fibrosis, and lipid pneumonia was also excluded. They concluded that finely divided aluminum was responsible for the lung damage.

—L.H.M.

Industrial Hygiene Controls

Evaluating Air Pollution Problems. R. O. McCaldin.* Arch. Environ. Health 2:228 (March) 1961. (*Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio)

As a result of the variety of atmospheric pollutants that must be measured, the number of instruments developed is legion. The author discusses some of the more widely used devices and techniques for measuring specific types of air pollutants.

1. High volume samplers: These are used to capture particulate matter under 100μ in diameter and "for the most part, those less than 1μ in diameter." They are used extensively throughout the country; therefore, comparable findings are available.

2. Filter tape samplers: Through the use of a 100-foot roll of Whatman #4 filter tape, one may collect 12 particulate two-hour samples for 20 days. Recently, a membrane filter tape has been substituted for Whatman filter paper, providing greater flexibility in use and analyses.

3. Dustfall: It is collected by using a standard glass or stainless steel container as recommended by the Air Pollution Control Association. Coarse particulate matter is collected for 30 days. Modifications are also discussed.

4. Sulfation rates: The lead peroxide candle sampler provides a simple, economical method of estimating sulfation rates of ambient atmosphere.

Gas samplers as well as sampling for fluorides and corrosion are discussed in detail. In addition to these determinations, a complete air pollution investigation should include evaluation of emission sources, a study of meteorological conditions, and evaluation of the effects produced by air pollutants.

—L.W.S.

Guiding Principles for State Air Pollution Legislation. F. Tetzlaff*, S. M. Rogers and S. Edelman. Am. J. Pub. Health 51:182 (Feb.) 1961. (*Division of Air Pollution, Public Health Service, Department of Health Education and Welfare, Washington 25, D.C.)

Twenty of the twenty-eight states having legislation for the control of air pollution have adopted or modified their provisions within the last decade. During this period, legislative action has

increased locally and also at national level with the authorization by Congress of a federal program for research and technical assistance in air pollution control. It is suggested that, although it is probable that air pollution is controlled best by local authority, the state may play an equally important role.

Air pollution legislation should have as its objective the maintenance of reasonably pure air resources to protect health, property, plant, and animal life, and for visibility requirements for travel, economic progress, and esthetic purposes.

Several general principles useful in drafting air pollution legislation at state, regional, and local levels are offered. The principles deal with definition of terms in legislation; identification of the agency responsible for administration of laws and specification of its authority; classification of air and establishment of air quality standards; issuance of permits and registration where indicated; and enforcement. In addition, it is recommended that legislation include a severability clause to assure that if part of the law is declared unconstitutional, the other parts shall continue in effect.

Current legislation may be divided into one of three types or combinations thereof. Some statutes provide for control on a statewide basis, while others now in force are enabling acts which facilitate control by local option. The third type provides for research and technical assistance. The features and specific areas of concern of each type are detailed for the reader. —M.K.

Organization of a Radiation Hazard Emergency Response Capability. A. J. Breslin,* W. B. Harris, and A. A. Weintraub. Am. Indust. Hyg. A. J. 22:59 (Feb.) 1961. (*U. S. Atomic Energy Commission, Health and Safety Laboratory, New York, N.Y.)

The U. S. Atomic Energy Commission in cooperation with the Department of Defense is operating a radiation hazard emergency response capability. This facility is designed to provide emergency assistance to state and local authorities in situations where an accident has occurred involving the use, transportation, or handling of radioactive materials. It is felt that this service meets an urgent need, since there are still many areas of the country where service of the type provided is virtually unavailable. The "capability," as the authors have designated it, consists of teams of specialists with just enough instrumentation to provide an accurate and rapid evaluation of a radiation hazard for the benefit of authorities in areas where an accident has occurred and to which teams are rushed. Recommendations are made accordingly.

Two important points are emphasized. First, the existence of the AEC capabilities in the various regional areas and means of contacting them should be made known generally in order that maximum effective use of this service will be made as needs arise. Second, local and state law enforcement and emergency agencies "should be able to recognize shipments of radioactive cargo and have familiarity with emergency procedures." It is anticipated that, as more states and cities develop their own radiological emergency facilities, the need for the AEC to provide this service will be reduced. —M.K.

Noise and Hearing

Efficiency of Impaired Ears in Noise: D. Relationship Between Type of Impairment and Auditory Masking. C. Lightfoot.* School of Aviation Med. USAF, Rep. 55-121, June, 1956. (*Air University, School of Aviation Medicine, USAF Randolph AFB, Texas.)

Thresholds for pure tones and spondee words in quiet and in two levels of white noise were obtained for normal hearing and hypacusic subjects in an effort to determine whether such a noise will produce the same amount of masking in an ear which is impaired (conductively or perceptively) as it will produce in a normal ear provided the effective level of the masking noise is the same for the two ears. Results indicated an abnormal relationship between masking and effective level of the masking noise for hypacusic subjects. For a low frequency tone or series of words, the masking was frequently less than it would be for a normal ear masked by noise of the same effective level, and, when the signal was a tone of 3 or 4 kcps, masking was frequently greater than normal. Data on subjects with perceptive disorders revealed there was no close relationship between the masking of words and the masking of pure tones in the range from 500 to 2000 cps although generally somewhat similar. The author concludes that these results suggest that the concept of the "critical band" as formulated by Fletcher may have but limited application to the masking of impaired ears, especially if the impairment is of the perceptive type. —R.G.H.

Forward and Backward Masking Between Acoustic Checks. D. H. Raab.* J. Acoust. Soc. America 33:137 (Feb.) 1961. (*Brooklyn College, Brooklyn, N.Y.)

Masking is the change in the threshold of detection for a particular sound caused by the presence of another sound. It is well established that the masking effects last throughout the application of the masker. It has been shown that these effects on the masked sound persist for some time after the masking sound is stopped. In these studies forced choice procedures were used to determine whether the masking sound would increase the hearing threshold for a test sound when the test sound was applied ahead of the masking sound in time. Masking of the test sound was demonstrated under the conditions just described. Time relations for this masking were compared with those for the condition where the test sound follows later than the masking sound. The masking of the advanced test sound occurred

when applied up to 40 or 80 milliseconds (msec.) before the masker, depending on the sound pressure level. The masking of a following test sound occurred for delays of 50 to 130 msec. These effects were demonstrated in all subjects, but considerable variability exists. These studies shed additional light on the complex masking phenomenon and indicate that it is probably associated with central nervous system mechanisms. —H.O.P.

Mutual Masking of Short Sound Pulses. L. A. Chistovich and V. A. Ivanova.* Biophysics 4:46, 1959. (*Pavlov Institute of Physiology, Academy of Sciences of the U.S.S.R., Leningrad)

The authors studied the masking of a short sound impulse by another similar pulse when the time relations between the pulses were varied. Their principal findings are as follows: (1) A fundamental difference exists between the masking of pulses and the masking of tone signals (studied by others); (2) One can distinguish three ranges of times between the pulses as determined by their masking relations: (a) during the period 1.5 msec before to 1.5 msec after the application of the masking sound its masking effects are large and nearly independent of the interval between pulses; (b) in the time range 1.5 to 50 or 100 msec before the masker is applied there is nearly no masking, in the time range 1.5 to 50 or 100 msec after the masker is applied the residual masking falls off exponentially; (c) in the range 50 or 100 msec to 300 to 500 msec, either before or after the application of the masking pulse, there is some increase in masking. (3) The differences between the masking of pulses and the masking of tons signals are associated with differences in the criteria the subjects use to detect the masked signals. —H.O.P.

Improved Method for Studying Tympanic Reflexes in Man. E. S. Mendelson.* Acoust. Soc. America 33:146 (Feb.) 1961 (*Air Crew Equipment Laboratory, Naval Air Material Center, Philadelphia, Pa.)

An interest in the physiological effects of intense sounds on the human ear led the author to attempt to measure the microscopic displacements of the ear drum that occur on reflex contraction of the middle ear muscles. An earlier method he developed was subject to much error, and out of trials on 57 subjects only 20 were relatively successful. The improved method described here has been uniformly successful with 14 inexperienced subjects when carried out by two relatively inexperienced observers. The details of the method and the data obtained are reported in six figures and two tables. Thresholds for the reflex vary with the frequency of the sound and were in the vicinity of 120 to 130 db for the frequencies 128 cps and 8192 cps. Thresholds were 10 to 30 db lower in the midfrequency region. The threshold variations demonstrated here and the influence of colds and nasal congestion on them, as demonstrated in these experiments, shed some light on the variations in the effects of industrial noise of constant level on the hearing of different persons. —H.O.P.

Radiation Health

Internal Radiation Dose Measurements in Live Experimental Animals—I. R. L. Hayes,* M. M. Nold, C. L. Comar, and H. Kakehi. Health Physics 4:79 (Dec.) 1960. (*Laboratory of Radiation Biology, Cornell University, Ithaca, N. Y.)

Silver phosphate glass rod dosimeters 1 mm in diameter and 6 mm long permit the dosimetry of beta or beta + gamma radiation at essentially a single point. Ionizing radiation produces permanent luminescence centers in these dosimeters which may be determined by the use of an ultraviolet source and a photomultiplier detector. A technique is described for embedding these detectors aseptically into the intestinal wall of an experimental animal. As much as six to eight weeks following their implantation, the dosimeters may then be removed and will indicate an integrated dose from, for example, orally administered beta radioactive material. —T.S.E.

Internal Radiation Dose Measurements in Live Experimental Animals—II. M. M. Nold,* R. L. Hayes, and C. L. Comar. Health Physics 4:86 (Dec.) 1960. (*Laboratory of Radiation Biology, Cornell University, Ithaca, N. Y.)

A known amount of yttrium-90 was fed to experimental dogs and goats, and the dose to the intestine determined in two ways. The first set of doses came from silver phosphate glass dosimeters implanted in the intestinal wall. The second set of dose measurements were calculated on the basis of isotope concentration in intestinal contents at several levels determined after killing the animal after a predetermined interval following ingestion. The two figures agreed remarkably well. A maximum permissible concentration calculated on the basis of extrapolating the dog data to man agrees well with the Handbook 69 value. It was discovered that the physiologic state of the intestine influenced the dose to a considerable extent, with a factor of 12 between the constipated and diarrheal animals. —T.S.E.

The Genetic Effects of Ionizing Radiation in Man. R. Turpin; J. Lejeune; and M. O. Rethoré.* Bull. Acad. Suisse Sci. Med. 14:571, 1958. (*Hospital Trousseau, Paris)

For the purpose of estimating the radiation dose required to double the present mutation rate, the variation in masculinity within two groups is compared: "one composed of subjects exposed to the risks of radiation-induced mutations (therapeutic irradiation or because of war); the other composed of subjects exposed to mutagenic risks of their age, apart from all artificial irradiation."

Abstracts

"By assuming that the decrease of masculinity as a function of the maternal age on the one hand, and as a function of ovarian irradiation on the other hand, is the reflection of the appearance of lethal mutations for the male sex, and by assuming that for the same numerical value these two deviations correspond respectively to the appearance of an identical number of mutations, we can calculate that" . . . a value of 30r/30 years would then represent the order of magnitude of the doubling dosage for our species. —W.D.N.

The Cesium-Potassium Discrimination Ratio. K. G. McNeill* and O. A. D. Trojan. Health Physics 4:109 (Dec.) 1960. (*Physics Department, University of Toronto, Toronto, Ontario)

Measurements were made of the cesium-137 and potassium content of a sample of Toronto people and a sample of average Toronto diet. More than one-half of the cesium-137 was estimated to come from milk and another one-third from meat. Although the fractions of both cesium and potassium absorbed into the blood stream were close to 100%, the longer residence time of cesium resulted in a relative concentration of cesium-137 relative to potassium of about 3:1. —T.S.E.

Regulatory Problems in Controlling Ionizing Radiations. M. M. Udel.* Arch. Environ. Health 1:497 (Dec.) 1960. (*Safety and Occupational Health Bureau, Metropolitan Life Insurance Company, New York, N. Y.)

Physicians confronted with administering a program for controlling ionizing radiations will be faced with legislative, staff, and human problems.

All groups who have faced the task of developing and promulgating codes have concluded that performance, rather than specification, codes are appropriate for radiation control. However, this means that administration will have to be considerably more sophisticated and that larger and better trained staffs will be needed. The present shortage of qualified radiation protection staffs in state regulatory agencies is being alleviated by several courses and documents which are now available. Among the human factors which become problems in radiation regulatory activities are the notoriety that radiation has achieved with the public, and the examples of forgetfulness and inappropriate behavior on the part of experienced radiation users who should know better. —T.S.E.

Decontamination of Human Skin Experimentally Soiled by Radioactive Materials. J. S. Felton* and C. J. Rozas. Arch. Environ. Health 1:87 (Aug.) 1960. (*Division of Occupational Health, School of Public Health, University of California, Los Angeles, Calif.)

That the removal of radioactive materials from the skin can be difficult is attested by the numerous agents and techniques that have been developed for this purpose. Some techniques may be insufficiently effective, some may cause an increased absorption of the radioactive material, and some may even cause a skin irritation. In this study, 11 skin-cleaning agents were tried on several areas of the hands and forearms of 155 human volunteers whose skin had been contaminated with a mixture of iodine-131 and phosphorus-32.

The agents employed were several formulations of a granulated skin cleanser, several waterless skin cleansers, titanium dioxide slurry, a homogenized cream, and plain water. Results indicate that preapplication of a silicone lotion or lanolin had a negligible effect on the residual contamination. A commercially available granulated skin cleanser was the most effective agent, removing essentially 100% of the contaminant following repeated applications. —T.S.E.

Mental Health

The Assessment and Rehabilitation of the Psychologically Handicapped. P. G. Weil* and A. G. LeBlanc. M. S. J. Canada 16:765 (Oct.) 1960. (*Queen Mary Veterans Hospital, Department of Veterans Affairs, Montreal, Que.)

A study of psychological factors involved in employability is reported. A psychological screening devise is described which will "differentiate between the employable and the unemployable." It is also felt this assessment technique will determine which applicants make the best employment prospects and therefore require the least amount of rehabilitative effort on the part of social agencies.

Subjects for the study were drawn from applicants applying for War Veterans Allowance in Canada on the grounds of "inability to maintain themselves." The group was further refined to those whose disability was due either to psychological reasons entirely or to a combination of both psychological and physical ones. The group included psychotics, psychoneurotics, psychopaths, alcoholics, inadequate personalities, and mental defectives.

Sixty employables and 60 unemployables were tested. The technique was subject to a cross-validation experiment with an additional 85 individuals. Impressive results are reported: "Of the sixty unemployable, [only] three were found to be employable by the test."

The assessment technique includes (1) an interview questionnaire of 34 personality, biographical, and work history items (not reported in the article), (2) two perceptual tests of intelligence, (3) two tests of psychomotor functions, and (4) a "stress test" using a mirror apparatus in drawing a figure.

The paper concludes with comments on the psychological aspect of rehabilitation and a suggested plan for techniques of rehabilitation at the Queen Mary Veterans Hospital in Montreal.

—A.A.M.

Abstracts

Mental Health and the Local Health Department. J. B. Aronson,* and V. T. Davis. Am. J. Pub. Health 51:89 (Jan.) 1961. (*State Department of Health, Trenton, N. J.)

The authors examine the role of the mental health department with respect to the entire problem of mental health. They note that a recent poll taken by the American Public Health Association indicates that public health leaders recognize that the problems associated with mental illness have a high priority in program development. "Without minimizing the significance of electric shock and drug therapy, we may with some justification conclude that the most significant advance in the mental health picture is the change in the attitudes of people, both lay and professional, toward the symptoms, therapy, prognosis, and social status of the mentally ill person."

Increasing progress with the hospitalized patient led to increased attention to the nonhospitalized patient. The health officer, in viewing his role in mental health, is apt to be guided by those patterns which were of value to him in communicable disease problems. He looks for an epidemiology and is concerned with critical periods in the individual's life span. Three such periods are suggested: (1) from the beginning of pregnancy through the first year or two after childbirth; (2) adolescence; (3) the period associated with retirement from the occupational role. Public Health should be concerned with attempting to reduce stress during these three critical periods.

Some public health services have instituted activities in group dynamics. Significant is the statement, "It is already becoming accepted public practice that the local health department has an important role in the rehabilitation of the patient discharged from the mental hospital." Of course, there are many other agencies that play important roles in mental health, such as schools, churches, mental health clinics, hospitals, social service agencies, courts, and practitioners of medicine.

—G.C.T.

Medical Care Administration

Three Challenges for Prepayment: 1. Build a Financially Responsive System Through Unity. J. Pollack.* Hospitals 34:32 (Nov.) 1960. (*Social Security Department, U.A.W., Detroit, Mich.)

Prepayment is entering a new stage in its history with new pressing problems. There is a rising consumer concern over cost, appeals to legislative bodies to review and regulate rates, requests for investigation of the conduct of prepayment, demands for greater consumer representation on the governing boards, and a resumption of consumer initiative in sponsoring plans that offer features not otherwise available.

The illusion of security offered by deductible and coinsurance and the promise of controls that they seem to hold has made otherwise conservative institutions remarkably adventuresome. Mounting losses, however, have dampened hopes, and a reappraisal is now under way. Major medical was a venture into comprehensive and long-term protection without medicine's backing. It showed that economic controls addressed at the subscriber alone would not work.

Blue Cross and Blue Shield cannot hope to beat the insurance companies at their own game. They have a temporary advantage because of tax advantages and what competitors call "discounts." As they more closely resemble insurance companies, the less they deserve special consideration from physicians and hospitals and in their taxes. When community rating is gone, these advantages are likely to go, too. If they still believe in community ratings, they should take active steps to explain to the public what is at stake. One way to strengthen community ratings is by offering new expanded contracts uniformly to the community.

Prepayment has been called "third party" payment. The fear that some third party would interpose itself between the physician and the patient has caused a Chinese Wall to be erected between payment and treatment, broken only by a cashier's window. Insurance influences whether, when, where, by whom, and how care is rendered. To the extent that money is injudiciously and unwisely applied to health care, it can become a more harmful barrier between patient and physician than was feared when the third party fallacy was conceived.

Labor and medicine regard each other over a wide gulf; but, in spite of the differences now existing, labor and medicine are ultimately destined to live in harmony. It is to the physician's interest to give good care and to the patient's interest to receive it. A mature system of prepayment can facilitate and assure this process, and both parties will benefit. To dream of the "good old day" of no third party payment is futile. We can never go back. The consumer, the profession, and the hospitals are committed to prepayment.

—A.B.

Three Challenges for Prepayment: 2. Tighten the Link with "Great Medicine." R. A. Nelson.* Hospitals 34:37 (Nov.) 1960. (*Johns Hopkins Hospital, Baltimore, Md.)

During the 30 years that have marked the growth of Blue Cross, there has been a corresponding tremendous growth in the science of medicine. Much of the treatment now provided in hospitals was unknown 30 years ago. The great majority of the drugs now prescribed were not on the shelf then; x-ray procedures which were then experimental are now routine. Great changes have taken place in medical practice, education, and research in the hospitals. Many of these changes occurred as a result of social changes brought about by high prosperity, inflation, and the spread of health insurance.

Blue Cross helped to provide emphasis on scientific examination of patients. Tremendous pres-

sures have been created in many areas for more hospitals, for more beds. Prepayment and the Hill-Burton programs provided the means. Great Medicine has brought to the public much better and more expensive health care, and Blue Cross has brought to the public a much greater consciousness of the cost of health care. Blue Shield, in attempting to meet the increased demand for protection against the medical and surgical costs, has run into serious conflict with the traditional "charge according to means" economy of medical practice.

Blue Cross and Blue Shield should do more research into their own activities. We need statistical studies of utilization, comparative studies of patterns of medical care and costs in various regions and under the different benefits, contracts, and administrative mechanisms. Blue Cross needs to understand more fully the relations of research to medical education and to medical care. Blue Cross is more than hospital insurance; it is cooperative prepayment for hospital and medical care. It should be concerned about the total picture and provide for a healthy future. It should understand and actively support all the elements of great medicine—medical practice, medical education, and medical research.

—A.B.

Three Challenges for Prepayment: 3. Resist the Pressures to Abandon Basic Principles. J. W. Paynter.* Hospitals 34:43 (Nov.) 1960. (*J. L. Hudson Co., Detroit, Mich.)

The principles under which Blue Cross has operated from the beginning are basic. They are things that most of industrial management have learned to recognize and respect. Some plans are pitching basic principles overboard and trying to meet the competition of commercial insurance on their own grounds, tossing aside community rating to try experience rating, diluting "service benefits" for cash indemnity. Some are doing nothing, sticking to principles but refusing to move forward in the clearly indicated direction of broader benefit programs. The greatest weakness is the lack of integrated program among the plans to meet commercial insurance's major medical plan. Blue Cross is based on a partnership with community hospitals, created by the hospitals with community leaders to provide, voluntarily in various communities, the greatest amount of hospital service for the greatest number of persons at the lowest possible cost.

One of the vital advantages of Blue Cross coverage for management is that the companies are not involved in the matter of delivery of benefits to their employees and their families. Blue Cross deals directly with the hospitals in verifying and then providing the coverage and paying the hospital for the service. Management needs to be assured that prudent use will be made of the dollars entrusted to Blue Cross, and it needs to know that management's best interest will be served, as well as the hospital's.

Management is paying a larger and larger share of the cost of health care. Cost is a serious consideration of management. It does not necessarily question that costs of coverage and hospital care are out of line but will increasingly demand that they be discussed, studied, and justified.

—A.B.

Internal Medicine

The Deep Reflexes in Old Age. M. Ellenberg.* J.A.M.A. 174:468 (Oct. 1) 1960. (*45 E. 66th St., New York, N. Y.)

Studies were made of 200 normal men and women 20 to 60 years of age and of 200 patients 65 years of age and older in regard to the presence or absence of deep reflexes, the knee and ankle jerks in particular. This study was made because the commonly accepted view is that the deep reflexes are normally absent in the aged.

The study indicates that absence of deep reflexes in persons 65 years of age or older are a rarity. Reenforcement elicited both knee and ankle jerks 39 times. The misconception that deep reflexes are absent normally in older people may be due to nonemployment of reenforcement.

Absence of tendon reflexes is nearly always pathological. Loss of these reflexes is the most sensitive guide available to indicate interference in the normally functioning peripheral nervous system. The knee jerks may be absent in toxic affections of the peripheral nerve before motor or sensory disturbances are evident.

The author stresses the importance of reenforcement before one calls a reflex absent. His study shows that the deep reflexes are present in old age and that absence of the knee or ankle jerks indicates a pathological state, frequently diabetic neuropathy.

—S.H.S.

Heart Murmurs Simulated by Arterial Bruits in the Neck. J. F. Stapleton* and M. M. El-Hajj. A. Heart J. 61:178 (Feb.) 1961. (*Department of Medicine, St. Vincent Hospital, Worcester, Mass.)

The occasional finding in children and young adults of basal systolic murmurs arising in the neck but simulating those heard with organic disease of the aortic or pulmonic valves is discussed. Four cases studied by phonocardiographic methods are presented. In general, these bruits are abrupt in onset, begin later than basal ejection murmurs (0.12 to 0.16 second after QRS onset), and last no more than a third of systole. These characteristics, together with the diamond-shaped contour declining by midsystole, suggest that these murmurs arise as "flow" rather than "obstructive" murmurs. Change in position of the patient or compression of the neck does not alter these murmurs significantly. As a general rule, these murmurs are loudest above the clavicles, although they may be traced down to the base of the heart.

Recognition that such murmurs exist and careful auscultation of the neck in young persons with slender chest configuration and evidence of rapid circulation will usually make the diagnosis possible without recourse to more complicated procedures such as cardiac catheterization and angiocardiography. —J.J.T.

Relationship of Elevated Blood Pressure to ECG Amplitudes and Spatial Vectors in Otherwise "Healthy" Subjects. P. M. Rautaharju* and H. Blackburn. Am. Heart J. 61:156 (Feb.) 1961. (*Department of Biophysics and the Laboratory of Physiological Hygiene, University of Minnesota, Minneapolis, Minn.)

Increased QRS amplitude together with low amplitude of the T waves (increased spatial angle between QRS and T vectors) have long been recognized as signs of left ventricular hypertrophy in hypertensive disease of moderate to marked severity. The present study presents a statistical correlation of these ECG factors with level of blood pressure, weight, and age in a group of ostensibly well rural Finnish laborers. The sample was divided into three groups based on WHO classification: Group A—BP less than 140/90 mm —215 subjects; Group B—BP 140/90 mm up to but not including 160/95 mm—146 subjects; and Group C—BP 190/95 mm up to but not exceeding 200/110 mm—107 subjects.

Significant statistical differences between QRS and T wave height and the spatial angle between QRS and T vectors were demonstrated between groups A and C. These changes are not primarily related to weight or age. The changes described are in the direction of those ECG findings which characterize hypertrophy and ischemia. They probably represent the earliest ECG signs of the myocardial effect of an increased cardiac workload. —J.J.T.

Dermatology

Triamcinolone Acetonide Cream in a Double-Blind Test. M. K. Polano.* Arch. Dermat. 83:214 (Feb.) 1961. (*Department of Dermatology, Municipal Hospital, The Hague, Netherlands)

In a double-blind clinical test on 18 patients with chronic pruritic dermatoses, 0.1% triamcinolone acetonide cream was compared with 1% hydrocortisone in the same base and was judged to be significantly superior. —M.M.K.

Attempts to Transfer Eczematous Contact-Type Allergy with Whole Blood Transfusions. L. C. Harber* and R. L. Baer. J. Invest. Dermat. 36:55 (Jan.) 1961. (*Department of Dermatology and Syphilology, New York University Post-Graduate Medical School, New York, N. Y.)

Although one group of investigators has reported success in passive transfer of allergic cutaneous sensitivity in man through both intradermal and intravenous injections of leukocytes from the peripheral blood of highly sensitive donors, seven attempts at passive transfer of allergic eczematous contact sensitivity to 2,4-dinitro-1-chlorobenzene, using a blood transfusion containing 1,000,000,000 mononuclear cells, resulted in failure. Two erythematous reactions occurred from challenge with 1% dinitrochlorobenzene, but at this concentration dinitrochlorobenzene may be irritating to some persons. —M.M.K.

Selenium Sulfide Intoxication. J. W. Ransone,* N. M. Scott, Jr., and E. C. Knoblock. New England J. Med. 264:384 (Feb. 23) 1961. (*Second General Hospital, APO 180, New York, N. Y.)

A case of selenium sulfide intoxication occurred in a housewife who had been using selenium sulfide shampoo improperly in the presence of open lesions of the scalp. Signs and symptoms included tremor, perspiration, metallic taste, garlic odor of the breath, abdominal pain, weakness, anorexia, nausea, and vomiting. An eczematoid dermatitis was not present, but it can occur and is made worse by sunlight. Laboratory findings included elevated urinary porphyrins and selenium in the urine. Selenium has long been known as an industrial hazard due to ingestion or inhalation of selenium compounds. —M.M.K.

Reevaluation of Reactions to Penicillin in Venereal Disease Clinic Patients. W. J. Brown,* W. G. Simpson, and E. V. Price. Pub. Health Rep. 76: 189 (March) 1961. (*Communicable Disease Center, Atlanta, Ga.)

The incidence of reactions to parenteral penicillin among clinic patients being treated for venereal disease in a three-month period in 1959 was greater than in 1954, when a similar study was conducted, but the increase was probably due to better observation rather than to increased sensitization. There were 255 reactions among the 35,496 patients treated, or 7.2 per 1,000. Urticaria was the most frequent reaction. There were 27 cases of anaphylaxis, but there were no deaths. On the basis of these findings, there is no need to change the present treatment practices in venereal disease clinics. —M.M.K.

Antigen-Antibody Reaction Site in Contact Dermatitis. J. Raskin.* Arch. Dermat. 83:459 (March) 1961. (*1209 St. Paul St., Baltimore 2, Md.)

Fluorescent antihuman globulin was used to identify the site of antigen-antibody reaction in biopsy sections taken from 10 patients with poison ivy dermatitis. A characteristic yellow-green fluorescence indicated that the antigen-antibody reaction took place only in the dermis. Early (6-12 hr.) fluorescence was noted in the upper dermis, especially in the papillary area, and in severe reactions was later (48 hr.) seen in the lower dermis. The intensity of the fluorescence could be correlated with the severity of the contact

dermatitis. Controls were negative, and tests for specificity of the antihuman globulin were made. —M.M.K.

Experimental Toxicology

The Carcinogenic Effects of Single and Repeated Doses of 3,4-Benzpyrene. W. W. Payne* and W. C. Hueper. Am. Indust. Hyg. A. J. 21:350 (Oct.) 1960. (*National Institutes of Health, Bethesda, Md.)

Mice were injected subcutaneously with 3,4-benzpyrene in single doses ranging from 0.008-0.5 mg and in repeated monthly doses ranging from 0.002-0.04 mg (total doses of 0.024-0.5 mg). The number of sarcomas induced by the single doses increased with increasing dosage over the range 0.025-0.25 mg, above which there was a leveling off of tumor response. No tumors were induced with the 0.008 mg dosage. A given amount of benzpyrene produced a higher percentage of tumors when injected in 12 monthly doses than when given as a single injection, except for the 0.025 dose. For the 0.5 mg dose, the effect was threefold. No leveling off of effect was seen in the repeated-injection studies, and tumor induction was delayed when compared with the single-dose studies. No tumors were induced at the repeated 0.024 dosage. It is concluded that a low-level recurring exposure to a carcinogen is more hazardous than a single exposure to the same total amount. —R.E.E.

Toxicology of the Silicones. R. R. McGregor.* Bull. Dow Corning Center Aid M. Res. 2:15 (Oct.) 1960. (*Dow Corning Center for Aid to Medical Research, Midland, Mich.)

A review is presented of data on biological response to the ingestion, injection, inhalation, eye instillation, and skin absorption of various silicones. Data on inhalation effects of silicone decomposition products are also reviewed. —R.E.E.

A Study of the Physiological Effects of Carbon Black : III. Adsorption and Elution Potentials; Subcutaneous Injections. C. A. Nau,* J. Neal, and V. A. Stembridge. Arch. Environ. Health 1:512 (Dec.) 1960. (*University of Texas, Galveston.)

No significant elution of absorbed component was obtained when channel or furnace blacks were suspended for up to seven days in blood plasma, gastric juice, or gastric juice containing 10% cottonseed oil. Channel black bound added benzpyrene so firmly that it could no be completely removed by benzene extraction. No significant tumor formation was obtained with channel or furnace blacks, with or without added adsorbed carcinogen, injected intraperitoneally or subcutaneously into mice. Tumors were induced with benzene extracts of furnace blacks suspended in cottonseed oil and injected subcutaneously into mice. Suspended in water, the same extracts did not cause tumors. Some tumors were induced when cottonseed oil in contact with furnace carbon black for one to six months was injected subcutaneously into mice. High tumor yields were obtained with methylcholanthrene suspended in cottonseed oil and injected subcutaneously into mice. Lower tumor yields were obtained with water suspensions. Tumors were also obtained by subcutaneous injection of one sample of benzpyrene suspended in water. Control experiments on tricaprylin and cottonseed oil are interpreted as indicative that the former may induce subcutaneous tumors. —R.E.E.

Potential Oncogenic Properties of High Polymers in Mice. W. L. Kydd* and L. M. Sreebny. J. Nat. Cancer Inst. 25:749 (Oct.) 1960. (*University of Washington, Seattle.)

Over a period of 575 days, no tumors related to treatment were induced in mice (Harlan stock Albino Swiss) in which subcutaneous implantations of the following resins had been made: aromatic epoxy resin (Epon 828 diethylene triamine); heat-cured methyl methacrylate (Luxene); autopolymerizing methyl methacrylate (Caulk, NuWeld), embedded one hour after processing; and, cellophane (5/1/2 H.S. Visking sausage casing). —R.E.E.

Heated Fats and Allied Compounds As Carcinogens: A Critical Review of Experimental Results. E. Arffmann.* J. Nat. Cancer Inst. 25:893 (Nov.) 1960. (*Finsen Institute, Copenhagen, Denmark.)

A critical review of the literature shows no valid evidence that heated fats are carcinogenic on oral administration, and chemical studies have failed to demonstrate known carcinogens in heated fats. Further, feeding experiments on rodents are considered inadequate for the demonstration of carcinogenic components in human food. Results on subcutaneous and cutaneous application of heated fats, cholesterol, and other unheated lipids are variable and inconclusive. It is concluded that subcutaneous application is not suitable to disclose dietary carcinogens. —R.E.E.

Acute Inhalation Toxicity of Vinyl Chloride to Laboratory Animals. E. Mastromatteo,* A. M. Fisher, H. Christie, and H. Danziger. Am. Indust. Hyg. A. J. 21:394 (Oct.) 1960. (*Ontario Department of Health, Toronto, Ontario, Canada.)

Exposure to mice and rats for 30 minutes to 10% vinyl chloride in air induced deep narcosis but no deaths; a 20% concentration was lethal for only one of five mice; a 30% concentration was lethal for all mice and rats. Exposures of guinea pigs to a 20% concentration induced deep narcosis, but only one delayed death; three of five guinea pigs survived exposure to a 40% concentration for 30 minutes. Responses of the animals at five minute intervals during exposures are noted. The principal pathologic changes in animals that died were congestion of the lungs with pulmonary edema and hemorrhage in some and congestion of the liver and kidneys. —R.E.E.

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About the Authors

► HAROLD J. MAGNUSON, M.D., last year became Chief of the new Division of Occupational Health of the U.S. Public Health Service. He has been a commissioned officer in the PHS since 1941, and for several years was actively engaged in venereal disease control programs.

Dr. Magnuson holds A.B. and M.D. degrees from the University of Southern California, Los Angeles. He interned at Los Angeles County Hospital, 1937-1939, and remained on for two more years in research and teaching at his medical school. His honor societies are Phi Beta Kappa, Alpha Omega Alpha, and Sigma Xi. He received the M.P.H. degree from The Johns Hopkins University in 1942.

Dr. Magnuson is author of some 60 published articles in the field of syphilology, as well as some publications in his present field of interest. He was certified by the American Board of Preventive Medicine and Public Health. He is author of the article in this issue, "Health Hazards in the Construction Industry."

► BEDONNA B. JACOBS, R.N., M.P.H., is Nurse Consultant in Occupational Health at the Allegheny County Department of Health, Pittsburgh, Pa., a position she has held since 1957. Miss Jacobs attended Kalamazoo (Michigan) College and then took nurses' training at Boston City Hospital School of Nursing, receiving the Diploma in Nursing in 1940.

Miss Jacobs was a staff nurse at the Boston City Hospital for a year, and then joined the United States Army Nurse Corps. She saw active service in North Africa and the European Theatre of Operations. After the war, she was assigned a tour of duty in Hawaii. She rose in rank from second lieutenant to captain. After Army service, she worked as an industrial nurse with the Tennessee Valley Authority briefly with a staff rating and for about five years as a head nurse. She left TVA to take her present position.

In the years 1950-1952, Miss Jacobs studied at the University of Pittsburgh and earned the degree of B.S. in Nursing Education. On a leave of absence from the Allegheny County Health Department, she attended Yale University and received the M.P.H. degree in 1960. Her article in this issue, "Selection of Occupational Health Nurses," is based on a study done in partial fulfillment of the requirements for her degree from Yale.

► WILLIAM F. BECKER, M.D., a native of Germany, graduated in medicine from the University of Munich in 1922. He did postgraduate work in general and in orthopedic surgery for the next six years and was certified as a specialist in orthopedic surgery in 1929 in Berlin, after which he engaged in private practice there.

Dr. Becker moved to this country in 1937, and in 1939 was licensed to practice in Illinois. He joined the staff at Hawthorne Works, Western Electric Company, Hawthorne Station, Chicago, Ill., in 1944, and was promoted to the position of Chief of Emergency Department in that organization in 1951.

Dr. Becker's article in this issue, "Prevention of Low Back Disability," is the sixth publication based on his experience at Hawthorne Works. He is a member of his county and state medical societies and the American Medical Association, and he is a Fellow of IMA.

► LOUIS BELINSON, M.D., received his medical training in Chicago, Ill. After graduating from Rush Medical College of the University of Chicago, he served a one-year rotating internship at Chicago Memorial Hospital. There followed a period of 22 years of service at mental institutions in the State of Illinois. These included Lincoln State School and three state hospitals: Elgin, Dixon, and Jacksonville. He served as superintendent at the last two. During these years, he participated in or led research projects in pentylenetetrazol (Metrazol) and insulin shock therapy,

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and fever therapy. He also served as a volunteer physician on the staff of the Michael Reese Hospital Psychiatric Clinic and as an instructor in psychiatry at the University of Illinois College of Medicine, Chicago. At the latter place, he participated in research projects in electroencephalography.

Dr. Belinson became Deputy Director, Division of Mental Diseases of the State of Missouri, in 1958, and he is a Clinical Assistant Professor of Psychiatry at the University of Missouri School of Medicine. He is certified as a Mental Hospital Administrator by the American Board of Psychiatry and Neurology and is a lecturer in hospital administration at Washington University School of Medicine, St. Louis. His article in this issue is "Mental Health in Industry."

► JAN LIEBEN, M.D., is co-author of the article in this issue, "Respiratory Disease Associated with Beryllium Refining and Alloy Fabrication." Since 1955 he has been Director of the Division of Occupational Health, Pennsylvania Department of Health, the organization which carried out the field project upon which the report is based.

Dr. Lieben is a graduate of Liverpool (England) University Medical School. He did graduate work at the Harvard School of Public Health, Boston, Mass. He is certified in public health and in occupational medicine by the American Board of Preventive Medicine.

Before going to his present position Dr. Lieben was associated, successively, with the New York City Department of Health, the Connecticut State Department of Health, and the Bridgeville (Pennsylvania) Plant of the American Cyanamid Corporation, where he was full-time plant physician. During this period he published articles on parathion intoxication.

Dr. Lieben is a fellow of IMA and of the American Public Health Association, and he is a clinical assistant professor of occupational medicine at the University of Pittsburgh.

► FRANZ N. METZNER, M.D., is a native of Germany. He received the Dr. Med. (M.D.) degree from the Universität Medizinische Facultät, Göttingen in 1954. This was followed by an internship at Patterson (N.J.) General Hospital, and a year at the Harvard School of Public Health, Boston, Mass., from which place he received the Master of Industrial Health degree in 1956. He returned to West Germany as an occupational health physician in the Department of Health, Lower Saxony, and further training in internal medicine at Hannover.

Dr. Metzner formally immigrated to the United States in 1957. After a year as resident in internal medicine at the Faulkner Hospital, Boston, Mass., he joined the Division of Occupational Health, Pennsylvania Department of Health, Harrisburg, Pa. While there he engaged in the field study which was the basis for the article in this issue, "Respiratory Disease Associated with Beryllium Refining and Alloy Production," of which he is senior author. Since Jan. 1, 1960, he has been in charge of the industrial medicine program of the Dubuque (Iowa) Packing Company.

—EDITOR

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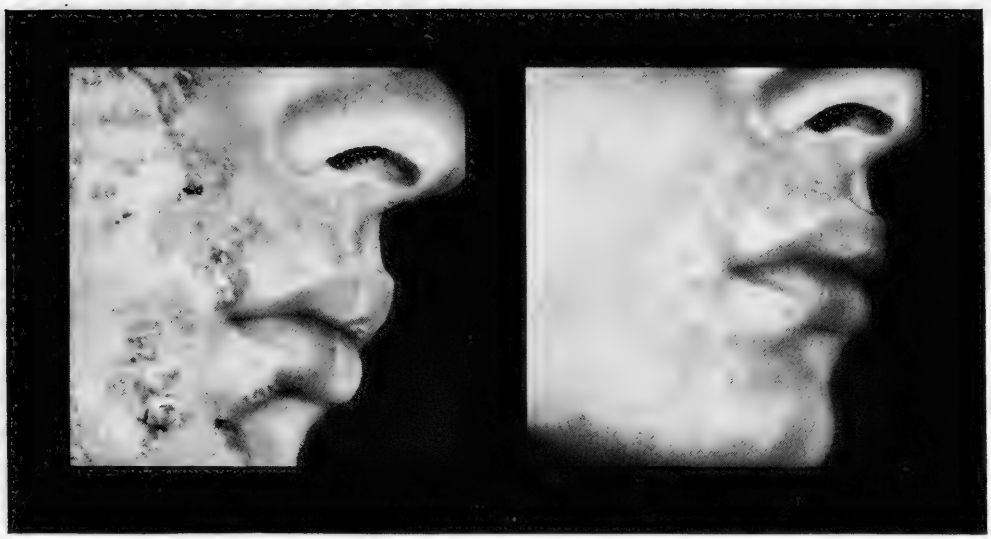

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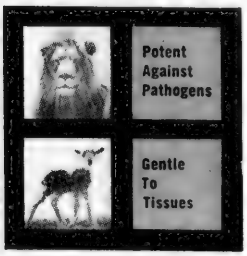

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People and Events

► LEO J. WADE, M.D., has been named Vice-President for Administration and Member of the Sloan-Kettering Institute for Cancer Research, it has been announced by DR. FRANK L. HORSFALL, JR., President and Director of the Institute. DR. WADE will be in charge of all administrative affairs including the supervision and coordination of activities of the grants and fellowships, fiscal, personnel and business offices of Sloan-Kettering, the largest private cancer research institution in the country. He will resign his current position as Medical Director of Esso Standard, Division of Humble Oil and Refining Company to assume his new post on July 1.

DR. WADE received his M.D. degree from Washington University School of Medicine in 1938. He served his internship at New York Hospital and had residencies at New Haven Hospital and Barnes Hospital in St. Louis. For the next 10 years he taught at Washington University School of Medicine, first as an assistant instructor in medicine and from 1946 to 1949 as Assistant Professor of Preventive Medicine and Public Health and Assistant Professor of Medicine.

He went to New York in 1949 to join Standard Oil Company (N.J.) as an Assistant Internist, and in 1950 was named Assistant Medical Director for Esso Standard Oil Company. He became Medical Director in 1951 and continued in that post until his present appointment.

DR. WADE is Associate Clinical Professor of Industrial Medicine at New York University-Postgraduate Medical School. He is also an Associate Attending Physician in Industrial Medicine at New York University-Bellevue Medical Center. He is a Fellow of the American Academy of Occupational Medicine, American College of Physicians, American College of Preventive Medicine, American Medical Association, American Public Health Association, Industrial Medical Association and New York State Industrial Medical Society, Inc.

Considerable recognition was accorded DR. WADE last year when he served as President and Chairman of the XIIIth International Congress on Occupational Health held in New York in July, 1960. He is a member of the editorial board of the *Archives of Environmental Health*, and is an abstracter of literature in the field of internal medicine for the JOURNAL OF OCCUPATIONAL MEDICINE.

Leo J. Wade, M.D.

► GEORGE M. WHEATLEY, M.D., has been appointed Third Vice-President and Medical Director of the Metropolitan Life Insurance Company, New York Life. Two new Associate Medical Directors have also been appointed—JOHN T. GEIGER, M.D., and GEORGE P. ROBB, M.D.

DR. WHEATLEY received his medical degree from Harvard Medical School in 1933. He served his internship at Hartford Hospital in Hartford, Conn., and served a residency at Harriet Lane Home of Johns Hopkins Hospital. He did post-graduate work at Columbia University and received the Master of Public Health degree in 1942. He has been associated with Metropolitan Life since 1941 and has been head of the Health and Welfare Division since 1959. He is a member of the Industrial Medical Association, the American Academy of Pediatrics, American Medical Association and the American Pediatric Society.

DR. GEIGER has been associated with Metropolitan since 1940 and

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has been an assistant medical director since 1943. He received his M.D. degree from Vanderbilt University School of Medicine in 1930.

DR. ROBB has been with Metropolitan since 1934 and has been an assistant medical director since then. He received his M.D. degree from the Indiana University School of Medicine in 1926.

► MAC ROY GASQUE, M.D., has been appointed to the newly created post of Medical Director of Olin Mathieson Chemical Corporation, New York City. He has been Medical Director of Olin's Ecusta and film operations at Pisgah Forest, N.C., since 1949.

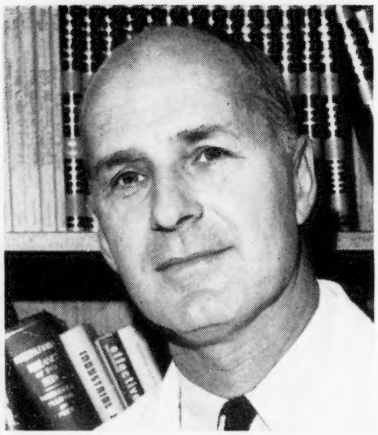
As Corporate Medical Director, DR. GASQUE will develop and implement modern industrial health programs for the corporation which emphasize preventive medicine and health promotion among employees. These programs, to be coordinated with Olin's safety program, will be tailored to meet individual plant and community needs.

DR. GASQUE received his M.D. degree from the University of Virginia Medical School in 1944 and spent several years in private practice before joining Olin. He holds a faculty appointment in the Department of Preventive Medicine at the Duke University Medical School and is a frequent lecturer at the Bowman Gray School of Medicine and the University of North Carolina. He is a Diplomate of the American Board of Preventive Medicine, certified in occupational medicine, and is a Fellow of the Industrial Medical Association.

► CARL S. PLUMB, M.D., has been appointed Medical Director of Olin Mathieson Chemical Corporation's Pisgah Forest (N.C.) Operations to replace MAC ROY GASQUE, M.D., who has been named Corporate Medical Director.

DR. PLUMB has been Assistant Medical Director at Olin's Pisgah Forest plant since 1955. He received both his undergraduate and medical education at the University of Toronto, earning his medical degree in 1952. He served his internship in the Orange Memorial Hospital in Orlando, Florida, and has done postgraduate work in occupational medicine at Yale University.

DR. PLUMB is Secretary of the Transylvania County Medical Society, a member of the Industrial Medical Association and of Alpha Kappa Kappa medical fraternity.



Mac Roy Gasque, M.D.

Glen S. Usher, M.D.

► GLENN S. USHER, M.D., specialist in preventive medicine and public health, has joined Owens-Illinois, Toledo, Ohio, as Medical Director. He succeeds CHARLES F. SHOOK, M.D., who has retired.

DR. USHER served in the U.S. Public Health Service from 1936 until he received his present appointment. During this time, he performed his duties in many states and in foreign countries. In 1957 he was Consultant to U.S. Operations Mission to Afghanistan to advise concerning the possible inauguration of a program of public health assistance to that country. In 1958 he was co-leader of the Epidemic Aid Mission to East Pakistan. At the time of his retirement from the Public Health Service, his title was Special Assistant for Medical Activities, Communicable Disease Center.

DR. USHER received his A.B. degree from Oberlin College in 1930 and his M.D. degree from Harvard Medical School in 1934. He has done postgraduate work at Johns Hopkins University where he received the degree of Master of Public Health in 1950. He is a Diplomate of the American Board of Preventive Medicine and Public Health and of the National Board of Medical Examiners. He is a Fellow of the American College of Preventive Medicine and of the American Public Health Association, and is a member of the American Venereal Disease Association, the Association of Military Surgeons of the United States and the American Medical Association.

CHARLES F. SHOOK, M.D., retired after 15 years as Medical Director for Owens-Illinois. He received his M.D. degree from Creighton College of Medicine in 1916 and served his internship at Omaha General Hospital. From 1917 to 1946 he served in the medical corps of the U.S. Army. During World War I he was a field hospital surgeon in the American Expeditionary Forces; during World War II he was Chief Surgeon, Communications Zone, Mediterranean Theater, and later, Deputy Chief Surgeon, European Theater.

DR. SHOOK is a Fellow of the Industrial Medical Association and served on its Board of Directors from 1953 to 1955. He was awarded the IMA's Meritorious Service Award in 1957. Until his resignation this year, he was a member of the Board of Directors of the Occupational Health Institute.

► HOWARD E. MATHAY, M.D., became Medical Director of the United States Steel Corporation's Youngstown District Works, Youngstown, Ohio, on June 1, according to an announcement by R. B. O'CONNOR, M.D., Medical Director of the Corporation.

DR. MATHAY was graduated from Western Reserve University School of Medicine in 1931. He served his

internship in the Youngstown hospitals and became Chief Resident Physician in 1932 and 1933. Upon completion of his residency, he began his private practice in Girard, Ohio. In 1941 he joined U.S. Steel in Youngstown District on a part-time basis, a position he held until his recent appointment.

DR. MATHAY is a member of the American Medical Association and a Fellow of the Industrial Medical Association and the Industrial Medical Association of the Pittsburgh-Cleveland Area. He is also past president of his local chapter of the American Academy of General Practice.

The Occupational Health Institute's Certificate of Health Maintenance has been presented to Kimberly-Clark Corporation's New Milford, Connecticut, plant. This was the twelfth Kimberly-Clark plant to receive such commendation. C. F. Yeager, M.D., Regional Consultant for the Institute, presented the Certificate to William Fieweger, Mill Manager. Left to right are John Haxo, M.D., Plant Physician; Harold Brandeleone, M.D., Kimberly-Clark Consultant; Dr. Yeager, Mr. Fieweger, Mary Gallucci, plant nurse, and Gordon Peterson, M.D., Medical Director of Kimberly-Clark Corporation.

► MARVIN ALBERG, M.D., Chicago, has joined the Business Men's Assurance Company of America in Kansas City, as an Assistant Medical Director. He is a specialist in industrial health and diseases of the chest.

DR. ALBERG received his A.B. degree from the University of Denver and his M.D. degree from the University of Colorado School of Medicine in 1947. He also holds a master's degree in public health from the University of Michigan, and has done postgraduate work at the University of Michigan, Harvard University, and Columbia University.

During the Korean action, DR. ALBERG was a Compound Commander in the U.S. Navy at Pusan,

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For relief of nasal congestion and muscular aches due to colds, hay fever. Also for allergic attacks; menstrual pain; muscular aches due to simple exposure or over-exertion.

Directions: Adults, 1 every 4 hrs.; children over six, ½ every 4 hrs. Limit 4 doses in 24 hrs. Caution: Use only as directed. Do not exceed recommended dosage or give to children under six. Keep out of reach of children. May cause drowsiness—do not drive or operate machinery while taking.

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Each Lozenge contains:

Neomycin Sulfate	2 Mg.
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Cetyl Dimethyl Benzyl Ammonium Chloride	1 Mg.

For temporary relief of minor sore throat.

Directions: Adults and children six years or over—place one lozenge in mouth and dissolve slowly. May be repeated every 3 hrs.

WARNING: Severe or persistent sore throat accompanied by high fever, headache, nausea and vomiting may be serious. Consult physician promptly. Do not administer for more than 2 days, nor to children under 6 years, unless directed by physician. Keep out of reach of children.

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People and Events

Korea. He also served as a Medical Officer at the Naval Hospital in Oakland, Calif., and the U.S. Navy Hospital in Long Beach, Calif. He is a Lieutenant Commander in the U.S. Naval Reserve.

DR. ALBERG'S previous industrial experience includes several years as Industrial Physician in the Medical Department of Standard Oil Company (Indiana). He is a member of the Industrial Medical Association and of Phi Beta Pi medical fraternity.

► Central States Society of Industrial Medicine and Surgery elected the following officers and members of the Board of Governors at its annual meeting in Chicago on May 21: President—EUGENE L. WALSH, M.D.; President-Elect—RICHARD C. SWAN, M.D.; Vice-President—GEORGE J. COOPER, M.D.; Secretary-Treasurer—ALLAN P. SKOOG, M.D.; Board of Governors, 1961-1964—WILLIAM L. BAUGHN, M.D.; C. HARLAN JOHNSTON, M.D.; G. PRENTISS MCARDLE, M.D.; PERRY G. PRATT, M.D.; and PAUL J. WHITAKER, M.D. Elected to fill the unexpired term of DR. COOPER on the Board of Governors was MERRILL P. BENOIT, M.D.

► The Industrial Hygiene Roundtable held its annual meeting May 5-7 at Seven Springs Farm, Champion, Pa. This group, organized in 1959, is composed of personnel primarily in administrative positions in industry, universities, and government and meets annually to discuss informally problems of mutual interest. Membership is restricted to 35 and is by invitation. Stewards for the 1961 meeting were H. H. SCHRENK and W. P. YANT.

► RALPH M. L. BUCHANAN, M.D., Phillipsburg, N. J., was recently elected President of the New Jersey State Medical Society. He was installed at the organization's 195th annual meeting in Atlantic City on May 15.

DR. BUCHANAN has been engaged in industrial practice since 1946 and he serves a number of New Jersey industries. He received his M.D. degree from Hahnemann Medical College in 1933. He is a Fellow of the Industrial Medical Association, the American College of Surgeons, and the International College of Surgeons.

The Industrial Medical Association of New Jersey honored DR. BUCHANAN at a dinner meeting and dance held at Far Hills Inn, Somerville, N. J., on May 19. He is a past-president of the New Jersey IMA.

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